AMERICAN FORESTS

AUGUST 1943

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AMERICAN FORESTS

VOLUME 49 AUGUST, 1943 NUMBER 8

Editor
OVID BUTLER

Associate Editors
LILIAN CROMELIN ERLE KAUFFMAN

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American Forests

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THE
AMERICAN FORESTRY
ASSOCIATION

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The American Forestry Association, founded in 1875, is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, that they may contribute permanently to the welfare of the nation and its people.

In addition to publication of its magazine—AMERICAN FORESTS—designed to keep before the people of the country important conservation questions and issues, the Association carries on educational work in various fields including forest fire prevention, reforestation, protection of wildlife, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, advancement of forestry by private endeavor, the teaching of conservation in schools and the promotion of research in timber growing and forest utilization.

The Association is independent and non-commercial, and has no connection with any federal or state governments. Its resources and income are devoted to the advancement of conservation in the interests of public welfare, and all citizens are welcomed to membership.

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The Forest Exchange

Chocorua Devotee

SIR: Just received the June number of AMERICAN FORESTS and, in particular this time, is my interest in the article entitled "Dream Mountain" by John Pratt Whitman, whom I have never met, but, who writes about MY mountain, in a very nice way.

He says Chocorua is 3,400 feet in elevation—well, that may be his approximate height, but when I was a boy and climbed Chocorua many times, the elevation was, as I remember, 3,508—though, my present day road maps call it 3,475.

Two of my aunts, Miss E. D. Allen, and Mrs. F. L. Steele, had farms in Tamworth, one on each side of the town, the former on Page Hill, which she owned; the other across the valley, and my brother and I spent many summers there, and we climbed Chocorua many times.

I wonder who the "Kansas youth" is and who is the "little girl" now grown to womanhood who has, long since, "recorded her 100th trek to its crest."

I have watched Chocorua so very many times—while helping with the haying, while picking potato bugs, while picking raspberries, blueberries and blackberries, and, while driving—(no autos in those days, you know) a pair of Aunt Beth's horses all around that country.

I saw Chocorua, the last time, in October 1940, on a trip through the White Mountains, and I know its beauty from all points, from Chocorua Lake, from the highways and from the fields. I know Chocorua and love her.—*Allen M. Nowell*, Tucson, Arizona.

Always Dependable

SIR: You may be interested in a short note on the good quality of old time white pine shingles:

"Rodney Buzzard came in Saturday to tell me about the everlasting quality of the old time cork white pine split and shaved shingle. Eighty-six years ago this year his father, the late J. H. Buzzard was born in a hewed log house on Cochrans Creek on the farm now owned by the Dean family. In his father's lifetime the shingle roof on this house was never replaced and it is still good. When the shingles were put on, of course, no one now living has any idea but we know it was more than eighty-six years ago. For many years the old house has been used to store hay in and not a leak has ever appeared in the roof to require repairing."

This quotation was taken from the *Pocahontas Times* of Marlington, West Virginia, on June 8, 1942, and was sent in by the State leader of blister rust control, Mrs. H. E. Yost, now in Virginia. —*Roy G. Pierce*, Pathologist, Bureau of Entomology, Richmond, Va.

Comment on the May Issue

SIR: I wish to commend you and the Association on the May issue of the AMERICAN FORESTS. This publication is an outstanding one and shows remarkably well the entire picture of forestry as it relates to the Douglas Fir region. Subsequent issues covering other regions of the United States will bring to the attention of the public in a very comprehensive way forestry as it is today in the United States.

I wish also to congratulate the Association on its proposed program in regard to forestry which was announced in the April issue. This proposal is an outstanding appreciation of our forestry needs and if Oregon State College can further this movement in any way please feel free to call upon us.—*Paul M. Dunn*, Dean, Oregon State College School of Forestry, Corvallis, Oregon.

SIR: I have just come in possession of a copy of the May number of the AMERICAN FORESTS and consider this one of the finest examples of literature covering our great Northwest Forests that it has been my privilege to see.—*R. B. Miller*, Tillamook, Oregon.

SIR: Please accept my sincere congratulations on the excellence of your May issue devoted to the Douglas fir region. This is indeed a compendium of accurate and authoritative and interesting information about the famed fir country. It will serve as an excellent text for our students at this college. Every possible angle of the subject is covered, and I hope you will continue this policy in reference to the western pine, southern pine, southern hardwood, northeastern and other forest regions of the country that have particular interest to the American public. I spent a whole evening reading this thoroughly worthwhile document. It has told the story of the Northwest as it has never appeared before in print.

My hearty congratulations! —*Nelson C. Brown*, New York State College of Forestry, Syracuse University, New York.

We Thank You

SIR: AMERICAN FORESTS is one magazine I am retaining on my list. I look forward each month to its coming. It brings beauty, inspiration and a wealth of interesting articles.—*Mrs. Louis K. Appel*, Chicago, Illinois.

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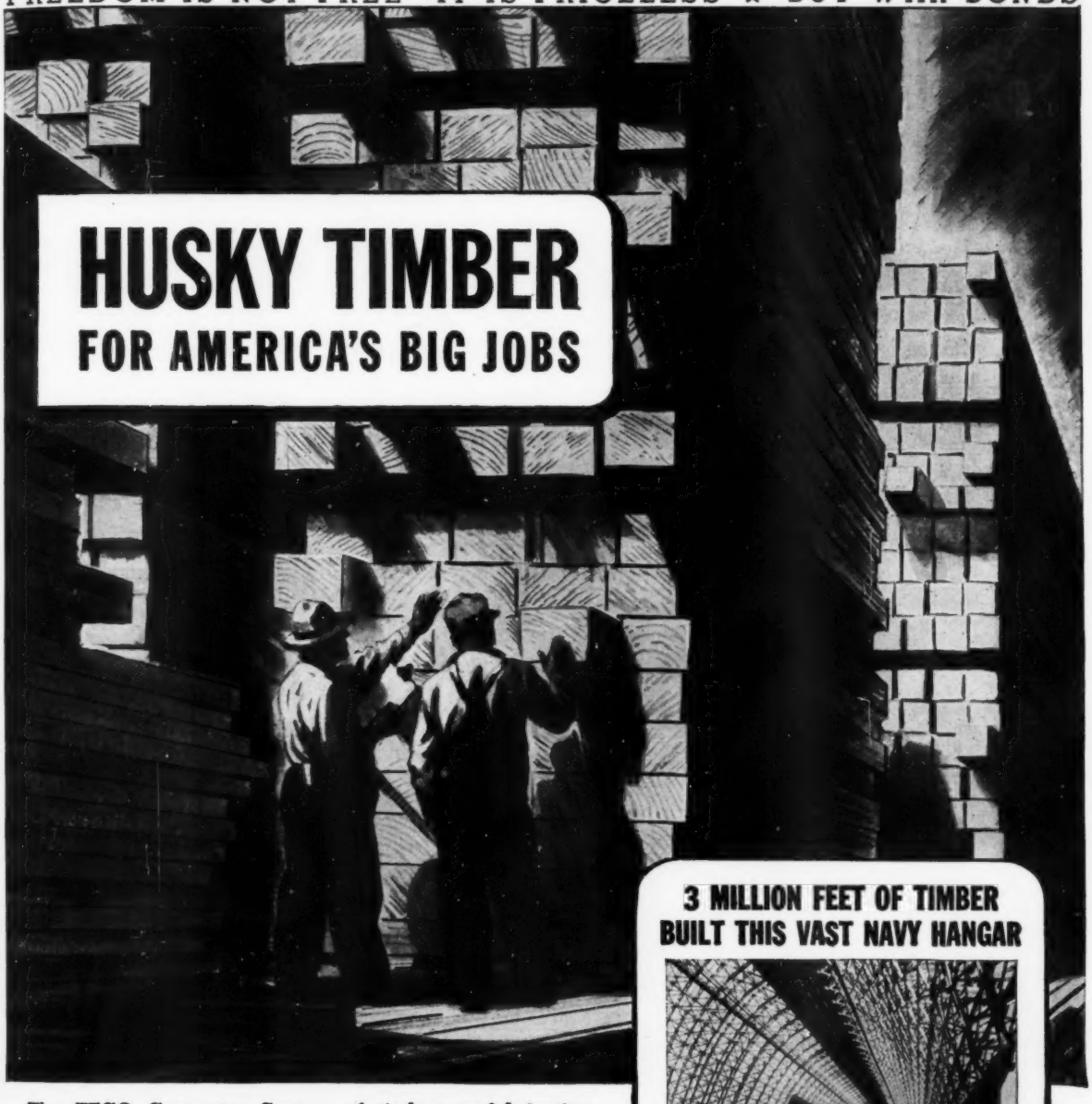
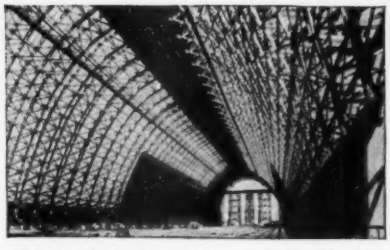
HUSKY TIMBER
FOR AMERICA'S BIG JOBS

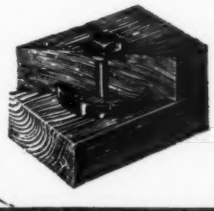


The TECO Connector System of timber prefabrication makes it possible to employ timber *efficiently* and *economically* in heavy structural engineering. Many great war plants, shipyards, docks, warehouses, hangars, bridges, and towers have been built entirely of timber under the TECO Connector System. From the lumber to the finished unit, every step in modern prefabrication is controlled by sound engineering practice. The use of TECO Split-Ring Connectors and TECO precision grooving tools results in a high degree of speed, both in assembly and in erection.

3 MILLION FEET OF TIMBER BUILT THIS VAST NAVY HANGAR



Construction view of one of the Navy's mammoth new blimp hangars. Length 1,000 feet; clear-span width 237 feet; height 153 feet. Timber prefabricated by Timber Structures, Inc., Portland, Oregon.



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THE EDITOR'S LOG

Where Is the Lumber Going?

Last year, according to government estimates, our forests were drawn on for forty-two billion feet of lumber. This is the largest yearly cut recorded in more than twenty-five years. Where did all this lumber go?

Most of it went into winning the war, as everyone knows. To record the more than two thousand uses to which it was put would call for a statistical atlas. A broad breakdown, however, shows that almost nine billion feet went into boxes and crates for the shipping of military and civilian products. Four and a quarter billion went to the factories for conversion into numberless essential articles ranging from matches to aircraft and ships. Seventeen and a quarter billion feet went into the construction of buildings for war housing, defense plants, railroads, authorized residences, etc., and almost twelve billion feet went to the Army, Navy, Maritime Commission and Lend Lease for direct military uses.

Much is being said and written about the lumber drain of the war upon our forests. The accumulative extent of this drain is not yet determinable. In point of quantity of wood being removed, it is probably over exaggerated in the lay mind. In point of quality of material being extracted from the forests, it is probably under estimated or not even considered by the average citizen. A picture of the over-all drain as respects quantity can be brought into some perspective by comparing the yearly cut during the war period with that of pre-war years. During the two war years of 1941 and 1942 the yearly cut averaged thirty-nine billion feet. This compares to twenty billion feet during the depression years 1930-39 and to thirty-seven billion feet during the prosperity years 1920-29.

Comparing the war cut of 1941 and 1942 with the depression years it impresses one as an alarming increase but when compared to the prosperous twenties it conforms closely to the cut during those years.

The outlook is that the 1943 lumber drain on our forests will be some twenty-five percent below that of 1942 due primarily to two factors: (1) the war will take less lumber in point of volume, and (2) shortage of labor will automatically curtail lumber production. Estimates compiled by the War Production Board and the Forest Service place lumber needs for 1943 at thirty-two billion feet, of which eleven billion feet will be required for shipping containers, four and a quarter billion feet for factory conversion, ten billion feet for construction and slightly over six and one-half billion feet for the Army, Navy, Maritime Commission and Lend Lease. There are men both in and outside the industry who doubt if under 1943 conditions of labor and equipment shortages it will be possible for the country to produce thirty-two billion feet. There are others who think that all the lumber needed will be made available.

As the picture now stands it would appear that the war drain upon the forests in point of volume of lumber wood removed is not greatly in excess of that during prosperous peace years but that after the war the main damage will be found in the loss of wood of high quality resulting from the exacting demands of war uses and in the sacrifice of young trees which should be left for future growth.

Tomorrow's Rubber?

Will some forty-eight great chemical plants now in course of completion for the manufacture of synthetic rubber have to be scrapped or diverted to other uses after the war?

This is one of the interesting questions that will confront readers of Dr. Earl N. Bressman's article "Rubber of the Future," on page 384 of this issue. Dr. Bressman is Director of the Division of Agriculture, Office of Coordinator of Inter-American Affairs. He has long been an advocate of the plantation system of producing rubber-bearing trees and plants. In the tropical Americas, he sees opportunities of growing improved strains of rubber-bearing trees on an economic scale to provide not only most of the rubber needed in the future but to provide it at a cost that will undersell synthetic rubber.

As in the past, price undoubtedly will determine the source of our future rubber stocks—whether from tropical America, the islands of the southwest Pacific or from chemical plants scattered throughout the United States. Prior to the war South America could not compete with the southwest Pacific but in tropical America the growing of rubber trees and plants has never been organized and scientifically developed. In the light of optimistic reports on the progress of our synthetic rubber program, Dr. Bressman's apparent conviction that plantations of rubber trees in South America can hold the balance of power in our future rubber world test the credulity of many people. And well it might when we read the following about one of the great synthetic plants—the Institute Plant located in West Virginia—scheduled for completion this month.

"The estimated capacity of this plant is 90,000 long tons of buna S per year, about one-seventh of the rubber needed by this country in peacetime. * * * When completed, the plant will have cost approximately $56,000,000 and will make synthetic rubber equal to 16,000,000 passenger car tires per year.

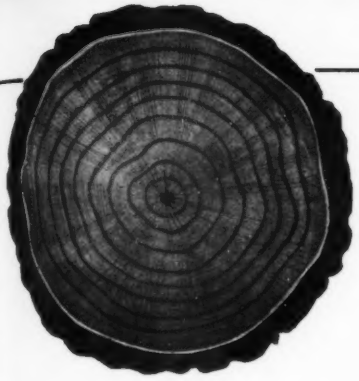
"This investment is less than that required for plantation rubber. To produce this same quantity of natural rubber would require a plantation of 270,000 acres, containing 24,000,000 trees, and would have taken five years to start producing. Such a plantation would cost about $80,000,000 to plant and bring into production, and require a labor force of 90,000 men. The Institute Plant, on the other hand, will be operated by a staff of 1,250. At rated capacity, it will consume 197,000 gallons of alcohol per day. If this alcohol were made from corn, this plant would consume each year the crop from 720,000 acres."

On the basis of the comparisons made, synthetic rubber looks like a formidable competitor for the rubber tree to meet. Still there's the small but powerful item of "cost per pound" to be reckoned with in the long run.

Lumberjack Nicknames

Strange and many are the hobbies which the forest inspires in many people. A compilation of them would be an interesting reflection of the vagaries of human nature. Beginning with the gentle little woman eternally in search of post cards bearing pictures of forest trees, outdoor hobbies run the scale to the strong-legged man who collects rocks and has as his challenging goal the possession of a stone from the highest mountain peak in each of the forty-eight states.

Unique and probably standing alone as a hobby is that of Henry S. Kernan, a young forester whose work is in the lumber camps of northern Idaho. "I have been collecting lum-



berjack nicknames from the old-time woodsmen," he writes, "and have about three hundred collected in the Clearwater River region of Idaho where the country's largest stand of virgin white pines is being logged and where the Wannigans still follow the peavey-wielding lumberjacks over one hundred miles down the river to the great Potlatch mill at Lewiston.

"The names are all authentic, and reflect some outstanding traits of the logger and his life. For example, next to the foreman, or 'push,' the most important man in camp is the cook. Thus 'Cold Ham' Sneider and 'Pig's Foot Bob' become famous, and are judged by the 'chuck' they put out.

"Next in importance is the 'bull cook,' who takes care of the bunkhouses. If the water is cold for the Wednesday shave, or the Saturday bath, or the Sunday washing, the men grumble, and name their bull cook 'Cold Water Aleck.'

"Nearly all lumberjacks are rovers at heart; but certain ones become notorious and earn such names as 'Overland Dutch' and 'Three Day' Brown.

"Still others reflect the predominately Scandinavian and Lake States origin of the Idaho woods labor. Thus we find 'Finn John' and 'The Galvanized Swede'; 'Mesabi Red,' 'Michigan Bill,' and 'Alpena Slim.'

"Sometimes it is a striking incident in a man's life which has given him his nickname. For example, the story is told of 'Cruel Jimmy' Holmes that during a log drive on the St. Maries River in Idaho, he cut off with an ax the leg of a man who had been caught in a log jam, but so saved his life.

"However most of the names have either no specific origin or else represent some obvious trait. 'Old Blue Point' had a bottle-blue nose; and 'Silver Top' Olson had white hair. Once you have heard 'Laughing Jim,' you never forget him. 'Six Horse' McGuinniss reminds us that teamsters are still part of the lumber camp; and 'Tobacco Juice' George that a quid of 'snoose' (as it is called) is part of the old-time logger's equipment. There are too many men for them to remember legal names; but let a man have some outstanding trait to distinguish him from his hulking, whiskered fellows, and he will soon have a nickname that will stick."

McNary's S-45

The Senate Committee on Agriculture and Forestry finally acted on Senator McNary's bill, S. 45, to increase the appropriation authorization for forest fire protection under the Clarke-McNary Act from $2,500,000 to $9,000,000, and recommended it for passage. (See "Conservation in Congress," page 406.) * This augurs well for its success and eventual strengthening of the cooperative efforts of federal, state and private agencies to protect the nation's forest lands from fire. To Senator McNary's persistent and successful handling of the matter, the country owes an expression of appreciation. Much, it is true, needs to be done to get the final approval of Congress back of the bill, as the House has not yet given it consideration, but with the Senate's endorsement the road is opened, provided public support is strongly united.

In this connection, it is gratifying to note that the Department of Agriculture has reversed its policy in respect to support of this particular bill and has endorsed it "as a single measure." Credit for this change in policy is undoubtedly due to the new Chief Forester Lyle F. Watts, who took office on January 8. Last year when the bill was pending before the Seventy-Seventh Congress the Secretary withheld the Department's approval. The position of the Forest Service at that time was that the measure should carry with it, among other things, public regulation of timber harvesting on private lands.

In explanation of its reversal of policy, the Department in a letter written the Committee on May 15th included the following statement:

"Because the Joint Congressional Committee on Forestry, in its recommendation for strengthening organized fire protection, conditioned increased federal allotments to individual states upon forest practices in those states satisfactory to the Secretary of Agriculture; and because this Department during the past three years has consistently recommended an increase in the Clarke-McNary authorization as one feature of a comprehensive legislative program that would include public regulation of forest practices on private forest lands, it is desirable for the information of your committee in its consideration of S. 45 to clarify the position of this Department with regard to the relation of S. 45 to the broader program.

"Forest fires are one of the major causes of forest destruction in this country. Another preeminent cause is destructive cutting of the forests on private lands. Although many progressive owners, to their great credit, are practicing forestry, they represent in the aggregate but a small proportion of the total cutting on private land. And 95 percent of our national cut is on private lands. No country in the world has been able to prevent destructive forest exploitation on private lands except through some form of public control. Such control is necessary as one foundation stone of an adequate forest policy and program that will establish a real forest economy in this country.

"This Department also believes that an adequate forest program must eventually include a greatly increased scale of public ownership, various Federal aids to facilitate private forestry, and measures to strengthen and intensify management of public forests.

"Thus adequate cooperative fire protection, important though it is, is in no wise a full solution to our long-time forest problem. However, because of the great importance and wartime urgency of forest fire control, we do recommend enactment of S. 45 at this time as a single measure, with the minor revisions heretofore enumerated.

"The Bureau of the Budget advises that the enactment of S. 45, with the recommended minor revisions, would not be in conflict with the program of the President. It also advises that further amendment of the act of June 7, 1924, to provide for regulation of forest practices on private land, expanded public ownership, and other expanded activities in the field of forestry would not, at least at this time, be in accord with the program of the President."

Orin Tustin

*On July 3 the Senate passed the bill.

The Grand Canyon of the Colorado — pride in America swells in the hearts of all who look upon the wonder of this mile-deep chasm

"Most of the people who visit the parks, whether they realize it or not or whether they put it into words, are impelled to visit them because of the quest for a supreme experience. The gleam of glaciers on a mighty mountain; the shimmering beauty of a lake indescribably blue, resting in the crater of an extinct volcano; the thunder and mist of water falling over sculptured granite cliffs; the colorful chapter in the Book of Time revealed by the strata of a mile-high canyon gashed by a rushing river; the sight of strange, new plants and animals living in natural adaptation to their environment and to each other; the roar of surf waging its eternal battle with the land; the silence that hangs over the ruins of the habitations of forgotten peoples; the lengthening shadows of the towering Sequoias—these and a thousand other vivid impressions are at the heart of the experience that national park visitors travel many miles to seek. All else that they do or that we do in the National Parks is incidental. If we can remember this, we can remain true to our high calling as trustees for the greater things of America."—Newton B. Drury

THE NATIONAL PARKS IN WARTIME

By NEWTON B. DRURY

THE IMPACT of war upon the National Park Service and the areas it administers has of necessity altered its immediate program. At the same time it has served to highlight the primary function of the Service as trustee for that portion of the Federal estate in which are preserved examples of some of the greatest phases of America.

Questions that have been latent ever since the first "national park" was established in 1872 are now sharply brought to issue. Most important among these is whether we can justify, under wartime conditions, the concept that some reasonable percentage of the lands of the Nation should be held inviolate from commercial exploitation on the theory that, thus administered, they serve their highest purpose.

The test is whether this austere ideal can be maintained in war as in peace.

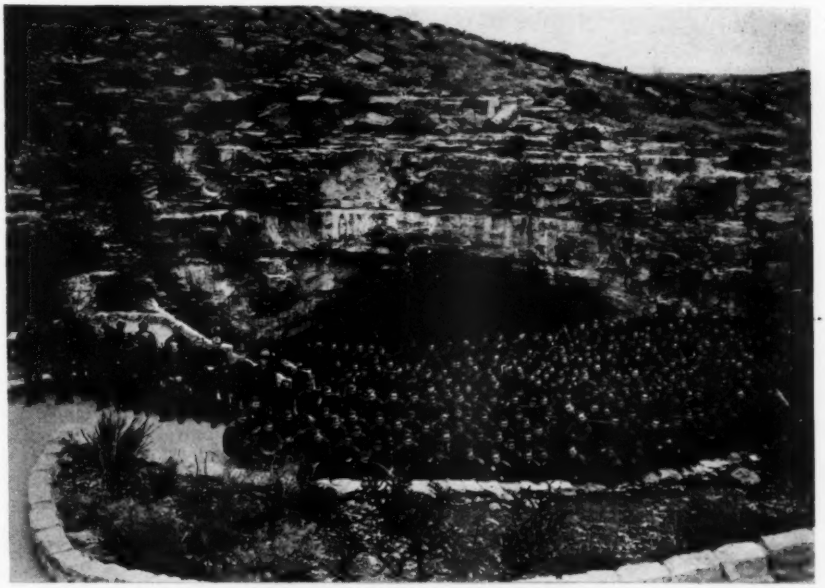
Today, the lands within the forty-eight States designated as the National Park System, which consists of 163 distinct areas, amount to approximately fifteen million acres, or about three-fourths of one percent of the Nation's total land area. The function of the National Park Service is to protect, administer, and interpret this nationwide system of significant and irreplaceable properties, which Congress, by the Act of August 25, 1916, establishing the National Park Service, indicated was to be so administered as "to conserve the scenery and the natural and historic objects, and the wildlife therein, and to provide for the enjoyment of the same in such manner as will leave them unimpaired for the enjoyment of future generations." The American people have every right to expect that so far as possible their national parks will be held intact as an important part of their cultural heritage.

Stress of war has compelled the National Park Service to take stock of its functions and responsibilities. Travel to the parks has declined to the point where it is only twenty-seven percent of the peak figure of 22,000,000 visitors in 1941, and it is obvious that increasing transportation restrictions will result in still further decreases. Appropriations and personnel have been curtailed and activities of many sorts have been suspended. Until after the war, the main task of the Service is one of protection and maintenance.

Travel to the parks, however, has not ceased, nor are they closed to visitors. A flexible system has been adopted which will adapt services and accommodations to the varying need as it develops under rapidly changing conditions. In war, no less than in peace, the national park areas serve as havens of refuge for those fortunate enough to be able to visit them. Affording an environment that gives relief from the tension of a warring world, the parks are, even now, being looked upon as a factor in the physical and mental rehabilitation that will be increasingly desirable as the war progresses. It has been necessary for the Secretary of the Interior to discourage civilian use of transportation resources involved in long-distance travel. Civilians not close by will find it exceedingly difficult to visit the parks. But even though the demands of war may sharply curtail civilian use for a time, Americans take pride and courage in the fact that the national parks and monuments are being protected and will be available for future enjoyment.

A new form of use has arisen. Since Pearl Harbor, approximately two million members of the armed forces have visited the areas administered by the National Park Service. There is significant meaning and definite justification of the national park concept in the fact that increasing thousands of members of the armed forces are being given opportunities they never had before and may never have again to see the inspiring beauty of this land of ours. A typical letter from the commanding officer of one battalion states: "Officers and enlisted men of this battalion join with me in expressing our appreciation to you and the members of your staff for the enjoyable time spent at Grand Canyon. I am sure the pleasant memories of this battalion's visit to Grand Canyon will long be remembered as a most worthwhile and educational trip."

Families of men on furlough have made great efforts to give their boys lasting impressions and experiences. One of the Park Rangers met an elderly gentleman on a Yosemite trail and asked him how he was enjoying himself. He said: "This trip is not for me. It is for my son who is a sailor in the United States Navy and has a furlough for a few days. I wanted to get him away from the war and give him something peaceful and beautiful to remember. One of the main reasons for this is that my



Since Pearl Harbor, approximately two million members of the armed forces have visited the National Parks — these are officers and men of the Coast Artillery at Carlsbad Caverns

Along a high Sierra trail in the Sequoia National Park — far-flung outpost of a free nation, well worth fighting to preserve

other son was killed on the battleship *Arizona* at Pearl Harbor."

Another phase of the usefulness of the parks to the military organization is indicated in a letter the park superintendent of Hawaii National Park received from a major general at the time he was transferred: "When I arrived, you turned over to me your new park headquarters building. Without it and your very effective cooperation in assisting me to carry out my mission, the work of my headquarters would have been seriously hampered. It is my hope, that when peace has come again, I may have the pleasure of visiting this wonder of nature with the leisure to enjoy the many scenes and exhibits for which, up to now, there has not been time available."

In defining the purposes of this war, President Roosevelt has said that we are protecting a great past. Evidences of this past, both as to human history and natural history, are contained in areas of which the National Park Service is custodian. The march of freedom in the United States is realistically revealed at the scenes where our forefathers fought and won independence and national unity. The battlefields of Yorktown and Gettysburg, the Statue of Liberty, the sites of pioneer exploration and national expansion, are well-springs of patriotism from which thousands gain inspiration and renewed courage. Pride in America swells in the hearts of all who look upon the mile-deep chasm of Grand Canyon, the geysers and hot springs of Yellowstone, the thundering waterfalls of Yosemite, the towering Sequoias, and the sweep of mighty forests on the Olympic Peninsula. Consciously or unconsciously there is built up within all who have had such experiences an increased faith in our country. Can these experiences fail to strengthen the conviction that this is a nation worth fighting for?

Direct use of national park lands not contemplated in peace time has been arranged when required by the needs of war. Over 675 permits have been issued to the Army, Navy, and Coast Guard, and other war agencies for the utilization of lands, buildings, and facilities. These permits cover a wide range of uses, some of them confidential. In the nation's capital, for example, the National Capital Parks have turned over to war activities lands and buildings valued at $24,300,000, which represents a saving to the Government since the alternative would have been to purchase others, probably at greater cost. Dollars cannot be used to evaluate all of what the National Park Service has done in connection with the war program. There is hardly an area in the National Park System that has not made some

direct contribution to aid in winning the war.

Despite extensive military use of the parks, there has been little destruction of permanent values. The Service has applied the same criteria to such uses as it has to proposals for lumbering, mining, grazing, or other non-conforming activities within the national parks. Everyone is aware that the cost of victory in this war is going to be high and that the natural resources of the nation will be called upon more and more to meet the shortages in available strategic materials. Inconvenience to park administration and to park visitors or remediable damage to park property have not been considered sufficient reasons for denying the use of park resources for war purposes. Only where uses proposed would do irreparable damage and entail destruction or impairment of distinctive features and qualities in the parks has the Service felt justified in raising these questions: Have all reasonable alternatives been exhausted before invading the national parks areas? Is the demand based upon critical necessity?

A case very much in point at this time is the pressure being brought to bear for the logging of Sitka spruce in Olympic National Park. Sitka spruce furnishes the outstanding wood for aircraft construction and the easily available supply of this species suitable for aircraft material in the commercial forests of Washington and Oregon is rapidly decreasing. There are, however, further stands of limited extent that could be developed by construction of access roads. There is also an abundance of Sitka spruce in the national forests of Alaska, but the shortage of manpower and equipment and the difficulties of transportation in rafts to Puget Sound sawmills have prevented a sufficient output to overcome the reduced production in Washington and Oregon.

There surely is ample justification for the consensus among conservation leaders that the forests in the national parks should not be cut unless the trees are absolutely essential to the prosecution of the war, with no reasonable alternative. Critical necessity rather than convenience should be the governing reason for such a sacrifice of an important part of the federal estate. If Olympic National Park is opened to the logging of spruce to meet war needs for aircraft materials, there will exist great danger that pressure to widen this breach will be injected by local interests to maintain local industries after the war is over. That issue was given consideration by Congress and definitely decided on a basis of national good when the Olympic National Park was established.

If the war lasts several years, all of the readily available airplane spruce, not only in the park, but in Oregon and Washington, will be exhausted. In that event, the transition to the use of substitutes, or the fuller use of Alaska and British Columbia spruce, will *have* to be made.

It may fairly be asked whether, in

The sweeping majesty of the Grand Teton range in the background, while in the foreground lies part of the much disputed territory of the Jackson Hole National Monument

view of the national importance of these last remnants of the once vast virgin forests of the Olympic Peninsula, the alternatives should not be exhausted before, rather than after, these forests are destroyed and an outstanding natural spectacle is lost to America forever.

From an economic appraisal of our natural resources, it should be remembered that approximately one-third of the land area of the continental United States, exclusive of Alaska, or 630 million acres is forested. Of this, some six and one-half million acres of forest are contained within the national parks and monuments, and 122 million acres within the national forests. Thus, the national park forests amount to approximately one percent of the total—certainly a very small fraction to be held inviolate in accordance with the national park pattern as established by Congress.

The greater part of the national park forests may be considered as "protection forests" which, because of the high elevations at which they grow, are of great value both scenically and for watershed protection, but are of little value for commercial use. The magnificent park forests at the lower elevations, however, though having potentially a high commercial value, are worthy of permanent preservation as outdoor museums for the benefit of this and future generations. If we should cut these forests, which include outstanding specimens hundreds of years of age, we not only would lose these forest giants forever, but also lose something far more fragile —the delicate ecological balance which exists among all the elements of the forest.

There are those who advocate the utilization of mature trees within the national parks on a selective logging basis. Such persons miss entirely the main point of the national park philosophy for they fail to realize that the removal of any portion of the forest under any system of logging, however restrictive, is contrary to the very principle upon which the national parks and monuments were established. Once logging is introduced into any area, it no longer exists as a superlative virgin forest. Future generations would be the poorer for the loss of the virgin forests in the parks, just as the present generations are poorer because they have no worthwhile illustrations of the magnificent white pine forests which were once a distinctive feature of the eastern portion of this nation.

The grazing interests also have sought entrance into the national parks and monuments in order to aid the war program. They are urged to increase production of food, hides and fiber, and, like the lumberman, are making sincere efforts to meet the nation's war requirements. In response to requests to open the national parks and monuments to grazing, the National Park Service recently undertook a careful analysis of all areas under its jurisdiction wherein grazing might be a possibility. The results of this exhaustive study proved that, within the great National Park System as a whole, the grazing potentiality is comparatively poor and is very limited. The study did reveal, however, that as a wartime emergency to meet the critical need for food and fiber, grazing could be increased on certain historic areas where livestock is not inimical to the preservation of the historical scene, and on recreational areas where it will not result in permanent physical injury.

A small amount of grazing still exists in ten national parks and a considerable amount in thirty-three of the national monuments and other areas. This situation was inherited at the time the areas were acquired, and is gradually being eliminated. Secretary Ickes, in appearing before the House Public Lands Committee on June 1, this year, said that the grazing rights of individuals in Jackson Hole National Monument would be guaranteed, and stated further that "such action in no way nullifies the long-time policy, which I have recently reaffirmed, under which grazing in national parks and monuments will be gradually decreased and ultimately eliminated. This policy is based upon long experience in the protection of scenery, wildlife, vegetation and other unique features in the national parks and monuments."

The damage to primeval areas resulting from grazing of cattle and sheep is extensive. Domestic animals in herds or flocks cause a definite change in the forests. Ecological balances are disrupted. Natural conditions are progressively altered and continued grazing will deteriorate the flowering meadows and grassy hillsides by changing the natural succession of plants. There is ample justification for the policy that grazing should never be allowed in truly superlative areas, and that it should be excluded as soon as possible from all national parks and from national monuments of the "wilderness" type.

Proposals have been made to mine certain critical minerals in national parks and monuments. The Service has taken the position that such invasion of a national park can be justified only when it would furnish strategic or critical minerals indispensable to the war and not obtainable in sufficient quantities elsewhere. In general, studies indicate that strategic minerals in national park areas are not of sufficient quantity or economic value to justify their extraction. There are exceptions, like one case in Yosemite National Park, California, where a valuable deposit of sheelite ore (tungsten) was discovered near the northwestern boundary. After investigation by the U. S. Geological Survey, the Bureau of Mines and the National Park Service, in cooperation with the discoverer, it was decided that because of its scarcity this deposit should be mined. Through the Metals Reserve Corporation, a government agency, the ore is now being extracted under careful supervision with a minimum of damage to the primary park exhibit.

The National Park Service is not classed as a war agency, has made no attempt to be so classified, and has not looked upon the war emergency as an opportunity to expand its functions. Nevertheless, there are many important economic values and strategic facilities within the national parks and monuments. They are protected in harmony with the purposes for which these areas were established. Our program has to do with the interpretation of natural values for the public, with emphasis on their esthetic and cultural significance rather than on their industrial and financial worth. Even so, there exists a strong relationship between the national parks and the economy of the nation. The facts are that the vast mountain and plateau regions throughout the National Park System contribute to the sources of rivers which supply industrial and agricultural areas with water for domestic use, navigation, irrigation, power, and recreation. These watersheds must be protected. The economic stability of communities within a radius of several hundred miles of park areas depends upon water supplies originating in national park and monument areas. Many of these communities are the location of vital war industries. Should the forest cover of these watersheds be destroyed there are likely to occur flash floods, rapid erosion, and stream pollution which would threaten the future of many communities and industries dependent upon a constant supply of good water.

This is an integrated society. The national parks and monuments represent an institution that has its proper and proportionate place in our national life. They are a segment of the federal estate that has been chosen for preservation so that this and future generations will see the untamed America that was, and understand the compelling influences that built and strengthened this nation. We cannot lightly abandon them, or the idea that gave them being, although we may have to sacrifice both in part if compelled to do so by the needs of war. Dr. John C. Merriam, in his recent book, "The Garment of God," points out that man cannot live in an

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A PROPHET PROFITS HIS OWN COUNTRY

By NELSON C. BROWN

ROBERT R. LYMAN, who has found honor as a prophet in his own land, is also president, forester and general manager of the Gray Chemical Company at Coudersport, Potter County, Pennsylvania. Potter County was once in the heart of a great lumber producing region. After the era of heavy cutting and worse fires it became the "Pennsylvania desert" and seemed to the early conservationists to be beyond redemption. Lyman has proved the fallacy of such pessimism by restoring the county's moribund economic flesh through application of large-scale industrial tree farming—growing, using, and regrowing crop after crop of timber.

Eastern foresters have been hearing accounts of the forty years of successful forest management conducted by the Gray Chemical Company in this unpromising environment. Harris Collingwood, Chief Forester of the National Lumber Manufacturers Association, came up from Washington; Valleau Curtis came from Callicoon, New York; Ernie Broderick, manager of the Northeastern Lumber Manufacturers Association, came from New York, and I went down from Syracuse to investigate.

Wood chemical manufacturers have been severely criticized for cutting their timberlands in a way that could not keep the woods productive. Wood chemical plants can use trees of small diameter, so a good deal of clear cutting of small stock is practised. So we were eager to see how the special problems of the wood chemical branch of the forest industry could be made to jibe with the larger principles of forest maintenance, permitting sawtimber to mature, and whether good forestry is in fact what Lyman's company is practicing. In Potter County we found proved accomplishment on all counts.

To set the stage: The first settlers reached Potter County about 1780 and tried to eke out a living from field crops grown under the most adverse conditions. Thin and rocky soils, steep slopes, high elevations meant short growing seasons and poor crops. Most of this land should never have been cleared for agriculture. Along the streams and in the lower valleys, farmers grow wheat, oats, and potatoes with moderate success, but many of the hill farms soon reverted to the forest. At the turn of the century sawmills were running at full blast and chemical mills taking the trees too small for lumber in a mad race to get the last possible stem. When all those operations reached an end, the forest was chalked off as "gone," and Coudersport where Bob Lyman makes his home and nearby Roulette, site of the Gray Chemical Company, seemed well on their way to becoming ghost towns. Yet both are thriving now on second, third and fourth growth timber.

Robert R. represents the fifth generation of the Lyman breed in those hills. He knows the country's history and can remember the old days. Therein lies the reason why he became a professional forester, graduating from Pennsylvania State, and served his journeyman years in the big timber of the far West. After time out to serve in France during World War I, he came home to a job with the Gray Company in 1919, and developed the forestry program that has rehabilitated his native soil.

The plant. At the left, chemical retorts using thinnings and low-grade wood. The sawmill on the right uses high quality logs—the final crop. White buildings house the workers

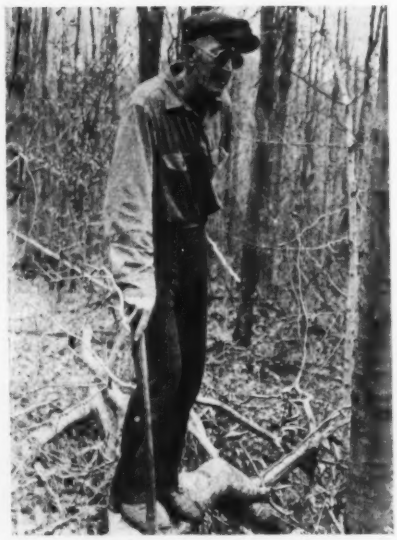
Clear-cutting in a low-grade forest. The next crop will be high-grade

Facing a task of forest reconstruction already begun but far from realized, he went into the woods. He cruised the hills, chopped down trees, skidded logs, piled, scaled, loaded and hauled cordwood, surveyed and located boundaries and cutting plots, laid out haulroads, hired men and studied their personal and work problems and learned how to get woodsmen to work with him toward the goal of good forestry. By the time that he became head of the Gray enterprise, he was "Bob" to everybody in the county.

The Gray Company makes wood oil, wood tar, methanol, acetic acid, charcoal and a dry blanket for molten metals. Each year twenty thousand cords of wood go through its charcoal kilns. This charcoal is the highly processed, activated carbon which is a strategic war material. The mill runs 'round the clock, 168 hours a week, 365 days a year, with the men on a progressive rotation pattern of four work shifts on a thirty-two hour cycle which has stood the test of five continuous years' operation.

Lyman's planned forestry grows wood so much faster than it is needed for the chemical mill that it gives sawtimber a chance to reach commercial maturity. To provide a market for such "climax" trees, the company operates a sawmill, using 800,000 feet of sawlogs a year. Slabs are salvaged as grist for the chemical plant.

When Potter County's economic death seemed imminent, the Gray Chemical Company staked its faith on second growth for its future raw material. Refusing to act as scavenger for the lumber industry, the company bought its own land. Since 1898 it has acquired 26,000 acres within a radius of twenty miles from Roulette, the bulk being in four large blocks. Company officers and employees individually own 10,000 more acres which Lyman has integrated with the firm's holdings in his forestry plan. Farm woodland in the county follows the same operating pattern as the company, which buys from 12,000 to 18,000 cords of chemical wood from farm lots each year, plus 1,000 cords from adjacent state forests.



A "permanent" woodcutter. Forest stability means labor stability

In 1923 Lyman surveyed the number of one-year seedlings in Potter County's second growth stands. They averaged 27,332 to an acre. After six growing seasons the struggle for existence had culled the weaklings and dropped the average to 8,468. A thinning program was then begun which left a stand of 2,824 trees on an average acre after fourteen growing seasons. Lyman's studies show that this figure will drop to 768 after twenty-five seasons, and that continued thinnings will leave 240 prime trees after eighty-five years—the maximum timber crop that such an acre will produce. The thinning program is being financed by the market afforded by the chemical plant for the thinnings as soon as they have reached cordwood size; and for tops, limbs, and sawmill slabs from sawtimber.

Wood is wood to the distillation kilns. Any tree trunk, limb, or top, provided it is not decayed and is free from certain defects, is grist for the chemical mill. Trees having no other industrial use are welcome. Two cords of chemical wood are worth as much as a thousand feet of sawtimber. Thus it pays to grow the smaller trees for the chemical plant as well as the larger ones for sawlogs.

Lyman practices three different kinds of cuttings based on differences in soil, slope, and elevation. The poorest tracts he cuts clear as soon as they have produced a merchantable cordwood crop. In time, when the soil has been restored and the last of the inferior stock (from the lumberman's viewpoint) has been weeded out, these plots will be able to grow sawlogs. Since hardwood regrowth is largely sprouts from old roots and is slower than pine, rapid stand improvement by clear cutting is not as simple as it is in the coniferous forests of the South and West, but, while the process continues, these tracts grow chemical wood crops in regular cycle. It was such otherwise waste growth as this with its regular cyclical harvest that kept the Gray Chemical Company going.

Better areas are strip-cut producing adjacent plots of trees of different ages to be cut in series, leaving trees of superior quality as seed stock. Experience shows that on thirty-year-old stands of hardwood about twenty-five cords can be cut to the acre leaving sufficient material to assure reproduction. On the most favorable sites, tree selection is practiced with the production of high grade sawtimber for lumber and furniture manufacture as its final objective. Such tracts are foresters' gardens.

Thus, in its three phases with their variations to fit peculiarities of site, Lyman's forest operation is a cross-section of modern American commercial forestry with increasing growth and ultimate sustained yield its never-forgotten objective. Lyman has brought his forest restoration along to a point where most of the tracts can be cut on a twenty-year cycle. He has established growth par at a cord an acre a year—high for hardwood. One plot, clear cut at eighteen years, yielded fifteen cords an acre, another at forty-five years, produced forty-five cords. Now, no stand is marked for harvest unless it bears at least twenty cords an acre.

An interesting phase of selective logging was demonstrated on one of the tracts along Lyman Run. From a stand of thirty to forty-year old sugar maple, black cherry, beech, elm, ash, and red maple, twenty-five cords an acre were cut, leaving five to ten cords standing. Trees with breast-high diameters upward of six inches were taken, leaving a residual stand of 200 to 500 stems, from one to six inches in diameter, for continued growth. In twenty years, these small trees developed rapidly in the open sunlight between the crowns of the few big trees, left as seed sources, to yield almost forty cords an acre. Thus, where soil and slope conditions make it practical, a dual-age stand of timber is grown to produce two cords an acre a year.

Another plot has produced in twenty-eight years: 1,093 sugar maples, 392 yellow birch, 218 red maples, 180 blue beech, 108 black cherry, ninety ironwood, thirty-three fire cherry, seven white ash, and five beech—a total of 2,126 trees an acre. This represents the remarkable reproductive capacity of "cut-out" northeastern hardwood forest land.

Instead of the roistering, migrant lumberjacks of the old days, Lyman's woodsmen are settled citizens, regularly employed on cutting operations that last the year 'round. Three hundred "regular" cutters, exclusive of mill hands, are employed throughout the year. This force is increased when needed by neighborhood farmers. The cash thus earned, plus income from chemical wood sold by the company from the farmers' own woodlots, aids comfortable farm families that otherwise would have been forced to move away. Now they can stay in their homes, raise chickens and some livestock, and retain their independence and self respect.

The company has built a number of small houses available for mill workers. A five dollars a month rental includes water, bathrooms, fuelwood, garden plots, electricity, and other comforts. Similar houses are provided, rent free, to married wood cutters who want them. Lyman denies that this is paternalism, explaining that wood cutters do not have assurances of daily work because of weather. Moreover, when he finds a good worker, he wants to keep him. Never has the company lost a discontented wood cutter from one of these homes. Some families cut chemical wood on part time. Some have bought old, abandoned farms. Some of the company houses are reconditioned dwellings on abandoned farms that have been absorbed into the company lands. The

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Thinning for chemical wood takes out the poorer trees, leaving the better ones to grow to sawlog size

Indian Moon Legend

By ESTHER LEE CARTER

Drawings by CALVIN FADER

This legend was passed down by word of mouth to the Longmire family, founders of Longmire Springs in Rainier National Forest, Washington. Old Indian Henry, very aged, and supposedly the last of his tribe, whose hunting ground is in Rainier National Park, told this as his tribal legend. They believed that their people originally came from the Moon, descending to Earth through a great hole in a crater, and settled near the base of Mount Rainier. The dark area that we now see in the moon is the place believed by them to be the great hole mentioned in the poem.—Editor.

Last of his tribesmen, Old Indian Henry,
Aged and wrinkled, his words faint and slow,
Musingly told of how all of his people
Lived on the Moon, many ages ago;
Told how his people increased in great numbers,
Hunted the birds and the deer and the bear,
Took all the fish from the lakes and the rivers,
Ate all the berries, with nothing to spare.
Suddenly, filled with a great premonition,
Pride of his followers, Chief Never-Roam,
Hearing the wails of his underfed people,
Felt they must perish, or find a new home.

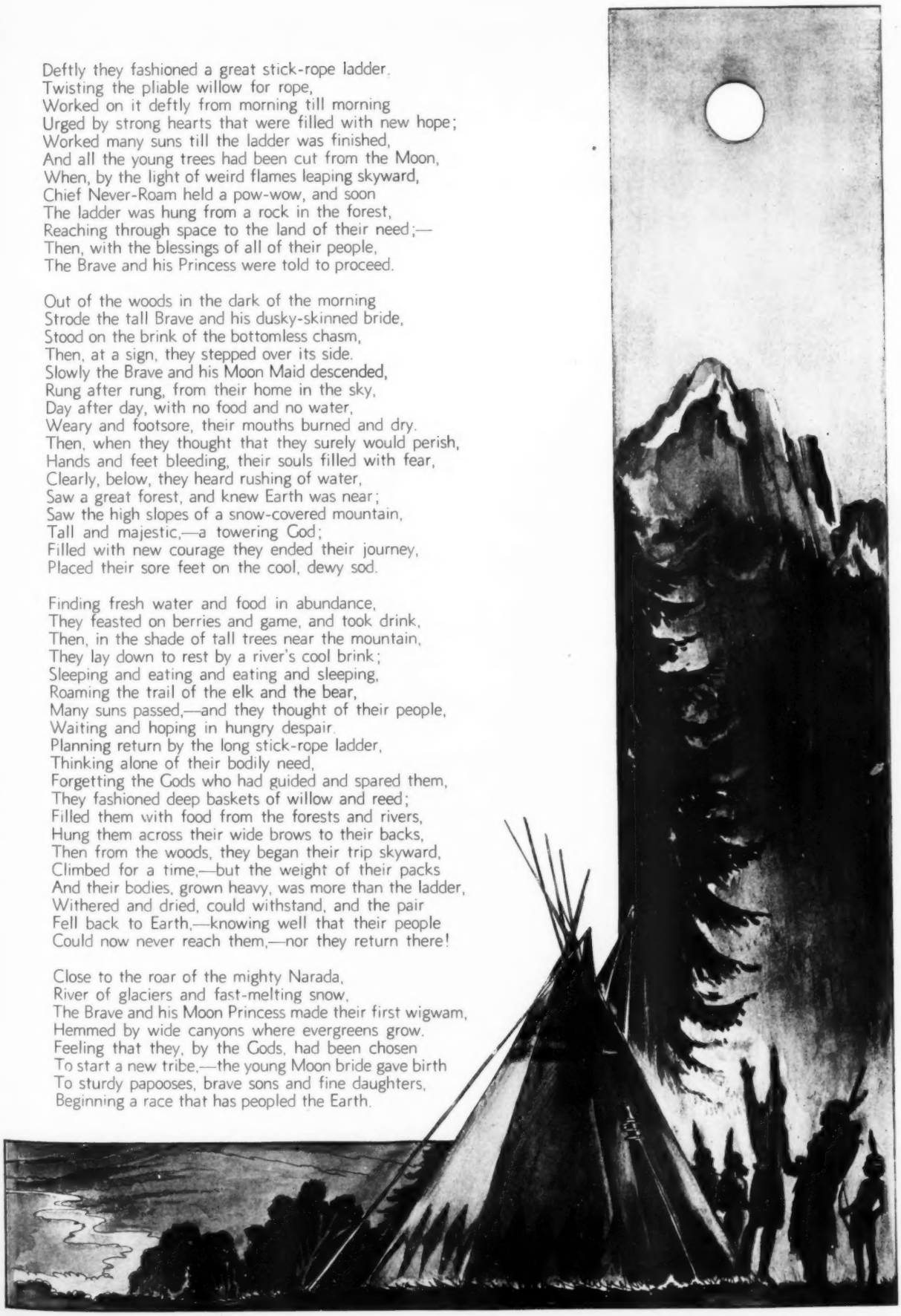
One day a Brave and his lovely Moon Maiden,
Searching for food, and relief from their plight,
Wandered afar, to the top of a mountain,
Saw through its crater a heartening sight!
There they lay prone and gazed steadily downward,—
Saw a new world lying far, far below,
Covered with trees and with swift rushing water,
Home of wild birds and of buck and of doe.
Quickly they rose and returned to their people,—
Told of the hole in the Moon, and how they
Hoped to descend and explore the new country,
Then to return and show others the way.
Gravely their Chieftain strode forth from his wigwam,
Listened in silence until they were through,
Then he returned with the Brave to the mountain,
Peered through the crater, and saw it was true.

Deftly they fashioned a great stick-rope ladder,
Twisting the pliable willow for rope,
Worked on it deftly from morning till morning
Urged by strong hearts that were filled with new hope;
Worked many suns till the ladder was finished,
And all the young trees had been cut from the Moon,
When, by the light of weird flames leaping skyward,
Chief Never-Roam held a pow-wow, and soon
The ladder was hung from a rock in the forest,
Reaching through space to the land of their need;—
Then, with the blessings of all of their people,
The Brave and his Princess were told to proceed.

Out of the woods in the dark of the morning
Strode the tall Brave and his dusky-skinned bride,
Stood on the brink of the bottomless chasm,
Then, at a sign, they stepped over its side.
Slowly the Brave and his Moon Maid descended,
Rung after rung, from their home in the sky,
Day after day, with no food and no water,
Weary and footsore, their mouths burned and dry.
Then, when they thought that they surely would perish,
Hands and feet bleeding, their souls filled with fear,
Clearly, below, they heard rushing of water,
Saw a great forest, and knew Earth was near;
Saw the high slopes of a snow-covered mountain,
Tall and majestic,—a towering God;
Filled with new courage they ended their journey,
Placed their sore feet on the cool, dewy sod.

Finding fresh water and food in abundance,
They feasted on berries and game, and took drink,
Then, in the shade of tall trees near the mountain,
They lay down to rest by a river's cool brink;
Sleeping and eating and eating and sleeping,
Roaming the trail of the elk and the bear,
Many suns passed,—and they thought of their people,
Waiting and hoping in hungry despair.
Planning return by the long stick-rope ladder,
Thinking alone of their bodily need,
Forgetting the Gods who had guided and spared them,
They fashioned deep baskets of willow and reed;
Filled them with food from the forests and rivers,
Hung them across their wide brows to their backs,
Then from the woods, they began their trip skyward,
Climbed for a time,—but the weight of their packs
And their bodies, grown heavy, was more than the ladder,
Withered and dried, could withstand, and the pair
Fell back to Earth,—knowing well that their people
Could now never reach them,—nor they return there!

Close to the roar of the mighty Narada,
River of glaciers and fast-melting snow,
The Brave and his Moon Princess made their first wigwam,
Hemmed by wide canyons where evergreens grow.
Feeling that they, by the Gods, had been chosen
To start a new tribe,—the young Moon bride gave birth
To sturdy papooses, brave sons and fine daughters,
Beginning a race that has peopled the Earth.



RUBBER OF THE FUTURE

Will It Come From Trees or From Test Tubes?

By DR. EARL N. BRESSMAN

TWO great rubber developments of far-reaching importance to the future of the Americas are on the move today. They are the creation in the United States of a synthetic rubber industry and, in the tropical Americas, the development of natural rubber production. Which of these two will win out in the long run?

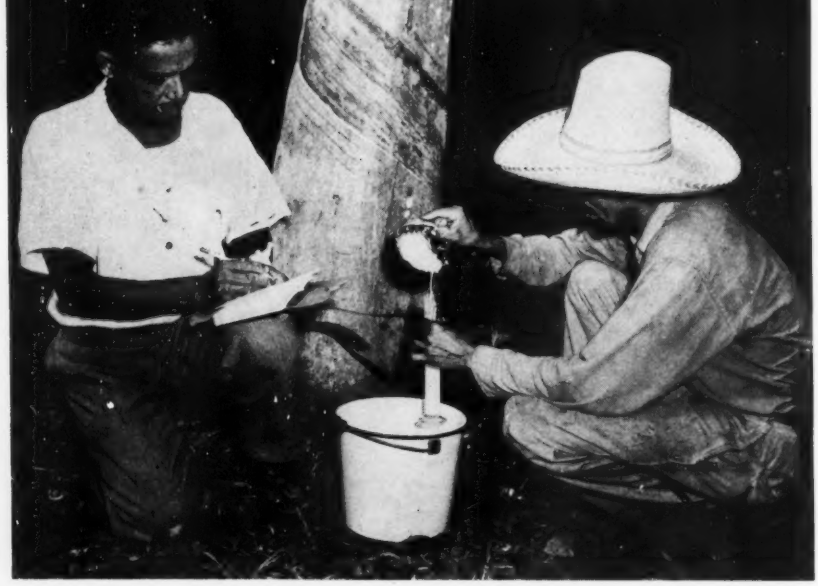
The answer holds large meaning for the Americas. Rubber is indissolubly bound up with the economic destinies of the hemisphere. What it means to our motor and machine age has been well illustrated in the repercussions from the loss of rubber supplies in the Far East.

Right now the important thing is to get rubber. We must get it from any and every source available, natural and synthetic, as quickly as possible. That is all that matters immediately. Without rubber, the United Nations war machine and the civilian economy of the Americas would be severely handicapped. Still it is worthwhile to look into the future and to examine now the challenging question: Are we to rely for the long-range upon natural or synthetic rubber?

Perhaps the answer to this question lies in the test tubes of patient chemists, perhaps in the research and experiment stations of the tropical Americas which are producing strains of disease-resistant and higher-yielding rubber trees. Which will win in the long run—the science of the industrial laboratory or the science of modern agriculture? The chemist has produced many fateful changes in our economic life in the last two decades. But probably no single development holds more potent possibilities than the race between the chemist and the agricultural scientist to supply the expanding needs of the machine age for rubber and to supply it cheaply and abundantly.

As director of the newly-established Inter-American Institute of Agricultural Sciences, at Turrialba, Costa Rica, I am identified with the scientific effort to grow natural rubber in the Western Hemisphere, to produce it economically so that American rubber growers may hold their own in the long-range test for survival, and may meet competition from any quarter — whether from improved synthetic rubber or from low-cost natural production outside the Western Hemisphere. I have faith in the ability of American rubber growers to hold their own, once they get well started with improved strains of rubber trees. I believe the costs of growing natural rubber in the Western Hemisphere can be reduced beyond anything which has been demonstrated heretofore. And, in that firm belief, I am hoping that naural rubber will have full opportunity to prove its capacity to survive, whether the competition comes from the ingenious chemist or producers able to draw upon large reservoirs of low-paid labor outside the Western Hemisphere.

A native tapper uses his machete to make a cut and start the flow of latex on a Hevea tree in Nicaragua



Harvesting plantation rubber in Honduras — the output of each tree is measured and recorded

Much of the rubber program for immediate war needs is concentrated on efforts to increase quickly the production of wild rubber in the Amazon basin and in Central America. The program also includes large projects for production of rubber from quick-growing plants, such as cryptostegia and guayule. I am concerned here mainly with the story of what is being done to put natural rubber production on a sound basis for the long run, with the possibilities for developing small unit plantations, with the question whether natural or synthetic rubber will become our chief source of raw material.

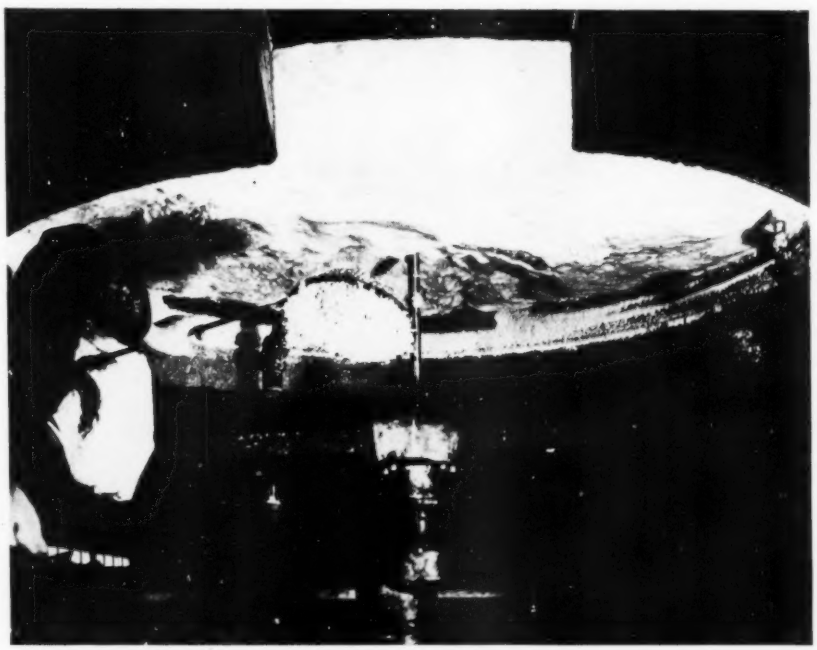
In the post-war period, we shall want to rely—certainly more than before the war—upon nearby sources of rubber. That will mean natural rubber from the tropical Americas or synthetic rubber from plants now rising in the United States. Perhaps these in combination will be the answer. For one thing, it must be recognized that rubber consumption in the other Americas is growing. If this trend continues, as appears likely, the other Americas will use more and more of their own natural rubber production. It also must be recognized that potentially the tropical Americas could increase rubber production greatly and provide a large exportable surplus.

Another point is that world rubber consumption in the past few decades has increased rapidly. The curve of consumption, both in and outside the United States, seems likely to continue to rise for a long time. Temporarily, in the United States, consumption is limited by need of conserving available supplies for war and essential civilian use. But probably we are near the low in war-time rubber consumption. Starting in 1944, the curve of both production and consumption may resume its climb. During the peak year of 1941, the United States used around 775,000 tons. The long-term uptrend in rubber consumption will mean the United States eventually will require 1,500,000 tons of rubber annually.

That means a billion dollar industry. What a prize for the chemist and agricultural scientist! Surely it rivals the gleam of wealth which drew gold seekers to the Americas hundreds of years ago. It is a story of fortune hunting evolving out of the urgent needs of war-time and the obscurity of patient research behind the drama of the fighting fronts. Yet, in the long-run, it may be one of the most important and outstanding stories of our time.

On the news desks, synthetic rubber has out-rated natural rubber in the headlines. This results partly from the controversy over production of synthetic rubber, whether it should be made of grain or oil, whether we should aim for capacity to make a million tons of synthetic rubber or half that amount. While this controversy draws the headlines, millions of young rubber trees grow in the sun of the tropical Americas. These are the vanguards of the new plantation industry which I believe will be able eventually to stand the test for survival.

In this new plantation industry, inter-American cooperation plays a big role. The Inter-American Institute of Agricultural Sciences, sponsored by the Pan-



Synthetic rubber in the making—from the test-tube in the laboratory (above) to the churning white liquid latex as it comes from the polymerizer, yielding two and a half pounds of synthetic rubber to the gallon

American Union, with initial funds provided by the Office of Inter-American Affairs, is but one symbol of progress in inter-American cooperation which is making possible the hemisphere rubber-development program. Fifteen of the Latin American countries, together with the United States, are active participants.

The United States Department of Agriculture, in collaboration with the tropical Americas, is carrying on research for the improvement of plant materials and for commercial stimulation of existing strains resistant to leaf blight as well as high-yielding strains. In the 100 cooperative nurseries established in the other Americas, nearly 30,000,000 budded trees already have been produced. These are material for the plantation industry. Five experiment stations strategically located are making available scientific research and guidance for development of plantations, small and large.

The most important of the cooperative field stations is located at Turrialba, near San Jose, the capital of Costa Rica. Started in 1940 this station is fully equipped and stocked. It possesses ample land for nurseries, clone collections and other limited plantings. Turrialba was selected as the site because it is ideal for investigation of the most serious pest of the rubber tree in this hemisphere, the South American leaf blight. The volcanic soil is excellent for growing rubber. Moreover, it is well situated to collaborate with the Inter-American Institute of Agricultural Sciences in future research and development work.

The government of Costa Rica has provided a thousand hectare experiment station, known as "Los Diamentes," which is about fifty miles from Turrialba. This farm is less than 1,000 feet above sea level and is representative of the broad northern coastal plain, which is well adapted for rubber growing. It will serve primarily as a propagation garden to supply bud-wood to growers in regions infested by the leaf blight.

Another important cooperative field laboratory is at Belem, Brazil, gateway to the Amazon rubber country. This laboratory is located at the institute, *Agronomico do Norte*, operated by the Brazilian Department of Agriculture. Considering its strategic position, the Belem center may have a key role in the development of rubber production in the Amazon basin. Studies will be carried on there in different kinds of Hevea rubber indigenous to the Amazon country. Scientists will collect bud-wood and seeds of superior trees. Up-river stations will be established to carry on agronomic research. Improvement in tapping methods and preparation of rubber from wild trees immediately are receiving special attention in view of the need of rubber for war purposes.

In Haiti, a cooperative field station has been established at Marfranc for propagation of planting material. This material will be available for distribution locally and to nearby countries. The leaf blight has not been found in Haiti. Strains of Hevea rubber susceptible to leaf blight will be crossed with resistant selections from the jungles of South America at the Marfranc station.

The cooperative field station at Tela, Honduras, is located at the famous Lancetilla Farm, research station of the United Fruit Company. Two plantations of mature seedling rubber trees planted in 1926 by the United Fruit Company are sources of seed used for root stock production. In addition, the latest of these mature trees is used in developing techniques for small-scale or family size rubber enterprises.

In Mexico, cooperative projects are under way with the Ministry of Agriculture at the El Palmar experiment station near the city of Tezonapa, state of Vera Cruz. Some 300 acres of mature rubber trees near this station provide ample seeds for production of root stocks and are under investigation for superior clones. Some of the latter, following blight-resistant tests at Turrialba, may prove valuable for commercial planting.

In former times, when there was no competition to force rubber growers to develop special products for specific uses, the latex yield from all types of clones and rubber trees went to make up a conglomerate mass. This yielded a general or all-purpose product which had to serve wherever rubber was required. This all-purpose product, of course, had many shortcomings. In the last three or four years before Java and Sumatra fell to the Japs, the Dutch were beginning to make great strides in developing natural rubber for specific purposes. They had found that latex from different rubber trees, and particularly different strains, varies greatly in its properties and that it was of value to keep the latex produced from different strains of trees separate for use where best adapted.

For years chemists have stressed the fact that some synthetic rubbers are resistant to oil and gasoline. Such resistant qualities can be utilized only in such limited ways as in the manufacture of hose for filling stations. To my mind in these times only such qualities as can be utilized in making tires are worth emphasizing. And chemists advocating synthetic rubber on the basis that it has tremendous possibilities in developing products for specific uses, apparently lose sight of the fact that Nature is far ahead of them in the ability to produce different kinds of rubber adapted to specific uses. This fact is lost sight of mainly because producers of natural rubber, particularly in this hemisphere, are not organized, that their product does not receive the wide and favorable publicity accorded synthetic rubber.

As regards price, of course, there is no comparison between the two products; natural rubber is much the cheaper. Even if the raw material were to cost nothing, it seems illogical to expect that synthetic rubber could be polymerized out of either alcohol or petroleum in a city factory, paying high taxes, wages and overhead, at a price comparable to that involved in the production of natural rubber, which is an ideal small-family industry. It is to the interest of rubber consumers in this country to see that the rubber of the future comes from a really cheap source. In the future, it should be possible with fully mature plantations of high-yielding trees to produce rubber at ten cents a pound or less.

Rubber production is an ideal small-family industry. The Goodyear Rubber Plantations Company, which has carried on experiments with tropical American rubber production since 1935, has emphasized that in the development of rubber production in this hemisphere small plantings can play an important role. Although there are some large plantings, like those of Goodyear in Costa Rica and Ford in Brazil, local farmers in those countries will be encouraged to make small plantings of a few acres and to utilize the large plantations and the cooperative experiment stations of the U. S. Department of Agriculture as sources of planting material.

No tropical crop is more suitable for farm production than is rubber. The mature trees are tapped and the latex is converted into dry rubber, usually smoked sheets, by a simple process which may be carried out with an investment in equipment of as little as $50. The equipment required consists of such materials as discarded oil drums, home-made wooden paddles, and crude smoke-houses built with local materials.

In the Far East over half the rubber is produced on individually-owned farms of less than 100 acres each. To bring these farms into production, the grower must wait from five to eight years before the trees are tapped and bring him a cash return. These growers use part of their land for producing food crops and often interplant the rubber trees with such tropical crops as coffee, cacao, bananas, and rice.

The effectiveness of the family-operated farm in rubber production has been amply demonstrated in Haiti in connection with the Haitian-American Agricultural Development Corporation, or SHADA, as it is popularly known there.

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EARLY WILDLIFE AMERICANA

By STANLEY P. YOUNG

The earliest recorded bounty plan for any predator on the Pacific slope of North America was designed to curb the depredations of the puma in Lower California, Mexico

MANY who are engaged, professionally or otherwise, in the field of natural history and conservation are inclined to be somewhat confused in their concept of its historical background. It is believed in many quarters that interest in conservation, with all of its ramifications, started from scratch early in the twentieth century, to develop through the following decades the impetus found so prevalent today pertaining to everything existing out-of-doors.

It appears to be true that nothing in the historical past indicates use or familiarity with such present-day terminology as embodied in "game management," "sustained yield," "deer irruptions," the "buck law" and "wildlife sanctuary." Nevertheless, early literature records that from almost the dawn of American history our forebears were not all killers or human predators to the extent so often claimed. Whether they realized it or not, they at times practiced some form of conservation in their daily dealings with wildlife.

The Lower California Indians, for example, occupying what is now the Mexican state of Lower California, rarely, if ever, killed the puma or the buzzard. Indeed, the entire peninsula formed what might be called the first "predator sanctuary" in North America. The god-like reverence shown the puma through centuries-long protection tended to maintain numbers of the animal over this region. According to the historian Clavigero, this was "caused by a superstitious belief on the part of the natives there, who did not dare to kill or disturb the animal in any way."

The turkey buzzard shared in this protection. This was because the puma and the buzzard for many centuries had materially aided the Indians in obtaining their daily sustenance. It was one of their customs to hunt methodically for a dead carcass after watching "the gath-

ering of the buzzards, and (searching) the ground carefully whenever they observed a number of these scavenger birds spotting . . . some carcass" which was "deposited upon or underground. By these means (the Indians) were enabled to discover the remains of a puma feast (generally a deer) which such a lordly beast, after the fashion of all the 'Felidae or Canidae' had hidden away here, and slightly covered with soil."

The vicuña, native big game of the Incas. Because of a plan of game management practiced for centuries by the early Peruvians, this American member of the camel family is still in existence

The sustenance of these Lower Californians thus obtained from the uneaten wild prey of the puma caused the Jesuit priests considerable concern when, with the building of their missions in the late sixteenth and the greater part of the seventeenth centuries, livestock was introduced from the mainland. It was not long until the puma became a serious problem for the padres and the early Christianized natives. As a result of the supplement to its food supply by the addition of the imported livestock, this predator increased throughout the Lower California peninsula.

The puma was known as the "Chimbieá" to the natives of Lower California, and the control of its depredations was early undertaken by the padres. The inducement offered the natives for the extirpation of the animal was in the form of a bounty, consisting of a reward of one bull for each puma killed. The custom prevailed during the time the priests had control of the missions.

This form of puma control was accordingly in effect for more than a century. It may be credited with being the earliest recorded bounty plan for any predator to be put into effect on the Pacific slope of North America. What results were obtained in controlling the animal's depredations on the ranges surrounding the missions are not clear, but it is evident that the reverence of the Lower California Indian for the puma was never fully discarded, in spite of Christianity, up to the time the Jesuits were compelled to abandon the missions.

Whether contact between the native Californians and the Indian tribes to the north and east, such as the Apache and Hualpais, was the cause of the reverence and protection these tribes are also credited with giving the puma is not known. Among the latter Indians, puma gall was a precious medicine administered in extreme illness. The efficacy of this was believed to increase the stamina in resisting the course of disease. It was believed that the victim would in a short time assume the fierceness of the puma.

The recent discovery of the Badianus Manuscript in the library of the Vatican proves also that the puma played a prominent role in the lives of the Aztecs, for a prick on the breast by a "sharpened bone" of a "white lion"—believed to mean a light-colored puma—was prescribed by the early Aztec physicians of Montezuma as an aid in staving off human death. This record, dated 1552, is believed to be the first in the Americas for any use of a part of the puma in materia medica.

The animal has long been a part of the Peruvian fauna. Indeed, it is from the early Peruvian Indians that the name "puma" was obtained. As depicted in designs on ancient Peruvian pottery, as portrayed by carvings on stone, and as imitated in gold or silver offerings to the sun, the puma was prominent in their lives and lore. The reverence shown it by the Lower California Indians does not seem to be so well established, however, in spite of its being symbolized. Under the Inca rulers, as will be noted later, it was killed at every opportunity.

The terrific mutilation the puma is capable of causing was apparently one of the main reasons it was used as an animal of torture in the dungeons of the Inca rulers for the repression of treason and disobedience. These dungeons were in many respects not unlike those of the Romans, where the African lion was used against early Christian converts. According to Means, "The Incaic dungeon contained beside the puma, the bear, and jaguar, and had blind doors and passages, the latter of which were floored with sharp flint points, and upon these were released toads, vipers, and vermin. Into such a Hades the human victim was forced, there to stay until dead."

That a successful attempt was made in early Peru to tame the puma as a pet, similarly as in modern times, becomes apparent in a study of the ancient Incaic capital of Cuzco. Of the twelve wards making up this Inca metropolis, one was named "Puma Curcu." Literally, the term means "lion beam," and it was in this ward that pumas were apparently tied to beams until tamed. It is from Peru, therefore, that we have the earliest record of its first contacts with man of the second largest of the wildcats of the Western Hemisphere.

The scheme practiced by the Incas, during the heyday of that civilization, in harvesting native big game was directly opposite to the reverence shown the puma by the California Indians. It appears that in spectacular hunting excursions the various Incas promulgated after the breeding season of their native big game, the vicuña and guanaco, as many as 30,000 hunters would take part. Garcilasso, the Inca historian, records that they would split up into "two parties, one going to the right, the other to the left, and forming a great circle of 20 or 30 leagues in circumference." This scheme was in reality the so-called "circular ring hunt" long in vogue centuries later in colonial America, and still practiced in the western United States with slight modifications in the driving of coyotes and jack-rabbits to slaughter.

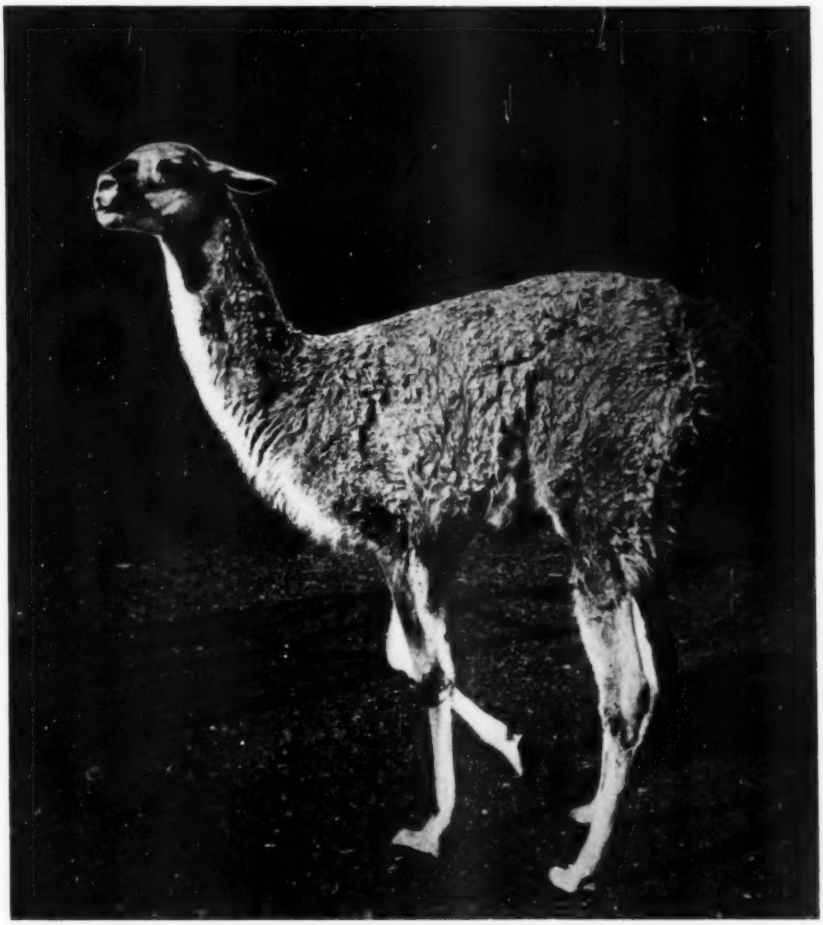
As the human ring gradually closed in around the animals so rounded up, Garcilasso states, as many as 40,000 deer, of various sorts, would be taken, also "lions, bears, many foxes, and wildcats." When the hunters sorted out the vicuñas and guanacos wanted for their wool, they were shorn and liberated. Others were killed for their flesh. A sufficient number of males and females, selected from the best animals, were released so that the species would be perpetuated. Each area chosen for the circular hunt was covered every three years. This rotation made possible a goodly supply of game.

All of the predators, including the puma, were killed, however, for these were the "creatures (that) did harm to the game," and it was the wish of the Inca rulers and their Indian subjects "to rid the country of such vermin." Garcilasso further states that the hunters "recorded the number of animals that had been killed, the vermin as well as the game, to know the number of head that had been killed and that remained alive; so as to be able to tell whether the game had increased at the time of the next hunt.

"The viceroys and Inca governors hunted in the same way, each one in his province, assisting personally in the hunt, as well for amusement as to see that there was no unfairness in the distribution of the flesh and wool to the people, and that the poor, who were the sick and aged, got their share."

This historic account is probably the oldest authentic record of any game management plan in the Western Hemisphere that included in its practice the control of predators. It is of further interest in that the game management program of these Indians included consideration of most of the fundamental principles that are recognized as essential in the management of wildlife today.

Possibly the plan of game management that for centuries was practiced enthusiastically by the early Peruvians had much to do with the perpetuation of the vicuña and guanaco, highly valued American representatives of the camel family. Despite the conquest by Pizarro, the sale of vicuña and guanaco products continued into the twentieth century. In 1913 approximately 5,000 vicuña and 20,000 guanaco skins went to the world markets. A decade later, in 1923, 30,000 guanaco skins, which probably included some vicuña skins, were sold.



Also a member of the camel family is the guanaco, preserved along with the vicuña. Both were highly prized by the Incas because of the value of their wool and meat — and therefore conserved

While the Incas utilized and conserved these wildlife resources, recent reports of excessive killing, especially of the guanaco, indicate that this species is now in danger of extermination. Thus it appears that in parts of the Andean region, Inca methods of wildlife management might have been continued to advantage to the present time. And, proceeding farther afield, the thought comes to mind that the Inca practice, although well known in principle, might be more generally adopted in dealing with big game in this country. One of the main factors in the success which the ancient Peruvians attained in the management and improvement of their guanaco-vicuña herds was the unrestrained enthusiasm and unfailing cooperation of each succeeding Inca ruler and his ruling subordinates in the management of their big game resources. The combination of politics and misguided sentiment that impedes so much of the carrying out of well planned modern conservation programs was apparently unknown to the Incas.

In our own country, Thomas Jefferson, whose bicentennial is being observed this year, was among the first of our early leaders to gain recognition as a naturalist and mammalogist. While serving as representative to France during the eighteenth century, he was called upon to defend the reputation for size of some of the larger American mammals.

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SLEET STORMS— A FOREST SCOURGE

By WINSLOW L. GOOCH

IN CERTAIN parts of the South the winter 1943 sleet storms exacted a heavy toll in the forests, especially in portions of eastern Virginia and southern Maryland where damage to pine stands was, to say the least, distressing.

The Piedmont Plateau between Washington, D. C., and Atlanta, Georgia, appears to be a belt particularly susceptible to such storms. In this belt the replacement costs for transmission line poles has in certain years reached many thousands of dollars. The actual and potential loss of timber has been very great since broken and down timber can only be partially salvaged because so much of it is inaccessible or below merchantable dimensions.

The land owner sees — loss of present and prospective timber and other forest values

Within this zone much of the winter precipitation is rain. A slight drop in temperature below 32° F. turns this rain into sleet and there is thus built up on trees, wire lines and other structures a weight of ice that unless relieved by immediate thawing results in widespread breakage.

The sleet storms that are most devastating in their after-effects are not an annual token passed out by Old Man Winter. Rather they are separated by a period of years. In Virginia, the last bad ice storm prior to the one the past winter was in February 1934. This storm left a heavy burden of ice and snow on the timber and was accompanied by a high wind that uprooted many large and mature trees. Many of those not wind-thrown had the tops broken off and today, nine years later, these decapitated trees have stooled out with a whorl of side branches at point of fracture giving to the tree in the absence of further height-growth a flat top appearance—a decided misfit tree in the stand.

The area most seriously affected by the storm of January 26 to 28, 1943, lies north and northeast of Richmond and extends into southern Maryland. Damage was severest in the younger pine stands. In close stands of large pole size the weight of the mantle of ice in the crowns was so great as to force bending almost to the horizontal of large blocks of trees. In selective cutting areas where smaller size pulpwood timber had been removed, there was considerable breakage, the breakage point being from a third to half-way down the tree. Seed trees that had been left on cutting areas due to greater age and root firmness stood up very well. In Richmond the maples, poplars, elms, and other soft-wooded deciduous trees suffered severely; large limbs and branches were torn, split and broken.

Likewise, damage to transmission

The tree lover sees—broken, distorted shade trees

lines was heavy. The ice core built up around line wires was two inches in thickness. Replacement of poles and other structural materials cost upwards of $125,000 and due to difficulties in procuring labor, power and telephone service could not be restored to isolated communities before midsummer.

Representing as it does, both fire and insect hazard, the real challenge is prompt salvage of this storm-damaged timber. Thousands of cords are suitable for pulpwood and excelsior wood, but because of labor shortage only a small proportion can be cleaned up unless outside federal assistance is forthcoming. Appeals have been made for use of men in conscientious objectors camps, but without success.

Roughly, 2,000 square miles are included in this damaged timber area. Local wood-using industries have offered farmers every accommodation for utilizing this broken timber by furnishing where necessary truck transportation to landings and yards. Such companies are deeply concerned lest widespread beetle attack may spread to the older merchantable pine that did not suffer so severely from the sleet. The southern pine beetle was serious in this section in 1936 and 1937 and several entomologists believe that this outbreak had its origin in the favorable environmental factors created by the ice storm of 1934.

The fire warden sees—increased fire hazards and greater fire fighting costs

Trees like this can sometimes be salvaged for pulpwood — but not always at a profit

The wire companies see— damaged communications

The situation is not unlike that created by the New England hurricane a few years ago. Decay of much of the pine wood during the coming year will make it unfit for use or sale for products other than fuelwood. But it will represent a constant fire menace for many years and one that can threaten destruction of timber stands over many hundreds of acres. Fires this past spring have burned with a fury much above normal, creating so great a heat that suppression crews are obliged to retire to distant roadways for back-firing instead of attacking the blaze directly.

But it is these same timber stands which furnish the raw material on which industry must depend for meeting the increasingly heavier demands for war goods. The need is urgent and with such a large proportion of the local population absent in the armed services or in defense plants, a salvaging program for this storm-damaged timber to include uniformly and completely the entire affected area is just too much for local people to handle. It is a forest disaster that in the light of the crying need for wood to meet war needs, merits federal recognition and assistance.

WAR AND THE FARM FISH POND

By O. LLOYD MEEHEAN

FISH FARMING has a long and venerable history. Down through the ages the fish pond has contributed to the economy of all civilized people. One author states that fish were hatched artificially in China about 2,000 B.C. The first classic on pondfish culture was written by Fan Lai in 475 B.C. Fish farming was first recognized as a part of agricultural practice in 1639 A.D. when Hsu Kwang Chih published his famous book, "A Complete Book of Agriculture." In fact it is so important as an agricultural project that in some parts of China six-tenths of the land is covered with ponds.

From there the industry spread to Rome where the carp was considered the food of royalty. Along with the Roman Legions the carp was carried into Europe where the farming of fish of all species is intimately tied up with the agricultural economy of such countries as France, Belgium, Poland, and Germany. Even Hitler recognized the value of fish farming when in the spring of 1942 he ordered all the ponds of Poland and middle Europe to be intensively farmed to increase the production of fresh water fish.

Although the carp plays an important part in the fish farming program of other countries, it is in disfavor here. It was introduced very early in our history and gradually spread to every section of the country, but the abundance of other fishes and the destructiveness of the carp to the habitat of game fishes soon placed it in disrepute. Except for an abortive attempt to propagate them in ponds during the last world war, the market supply has been derived mainly from the rivers and lakes of this country, largely as control measures to improve the habitat for game fish. With prices increasing at present there is an increase in commercial fishing and a considerable revival of interest in propagation methods, especially around the more populous centers of the country.

Just as the public is turning to the utilization of the cheaper cuts of meats because of the reduced amount of the better cuts available, they are turning more and more to fish which were previously thought less desirable. The lower production of fish during 1942, coupled with the fact that a very large proportion has been diverted to lend-lease, and the difficulty of transportation, has created a market for species which previously were not in demand.

Through the office of the Coordinator of Fisheries, state conservation departments, and home economics departments of some of the state colleges, many recipes have been developed for the preparation of less popular fish such as carp. The result has been a decided upward movement of prices and in the amount of carp reaching the mid-western markets.

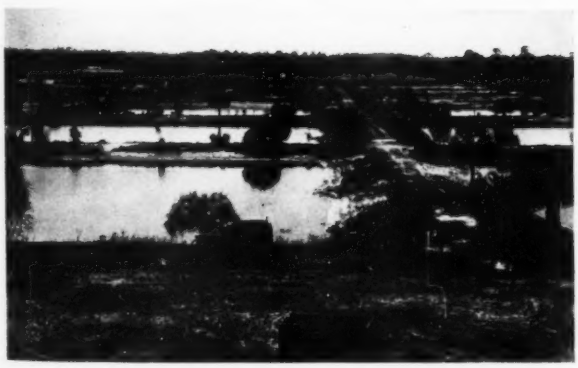
The propagation of other species of fish in ponds has been confined largely to the dealer handling them for sale to

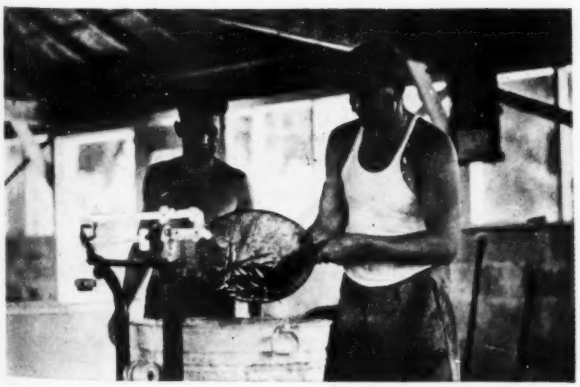
Fish ponds southern style. The ponds are constructed as part of erosion control and water supply management projects. Systematic fish culture can furnish a direct revenue from them

clubs for restocking purposes, or those selling fishing rights on an individual fish or poundage basis. In the last war some interest was shown for the production of these fish as food.

Such publications as "Fish Ponds on Farms" by R. S. Johnson and M. F. Stapleton of the Bureau of Fisheries, and "The Farm Pond and Its Productivity" by R. L. Barney and H. L. Canfield of the Minnesota Game and Fish Department, give methods used and information on fish farming at that time.

Since then the use of fertilizers has been given some study and a considerable knowledge regarding the management of bodies of water has been acquired. Beginning with the release of studies made at Alabama Polytechnic Institute, the construction of ponds on farms for the propagation of bluegill and bass for table use has received new impetus. Recent advances in the knowledge of land management have assisted in this program.





(Upper) Farm fish pond products. Pond-grown southern bass may weigh up to nine pounds

(Center) Hatchery pools such as this one at Welaka, Florida, provide "stock" for farm ponds

(Lower) Fingerlings for stocking farm ponds. A given number, size and weight are used to the acre

Ponds constructed for the control of soil erosion have, through the proper practices applicable to erosion control, become suitable habitats for wildlife and fish. The new concept, that good conservation practices applied to one of these resources assists in the conservation of all, is exemplified in good farm fish pond practice.

Suitable vegetation planted on the shore and on the watershed surrounding the pond prevents the removal of valuable soil which takes years to rebuild. The waters of the pond cleared in this fashion become desirable habitats for fish of various species and the fertilizing elements and organic matter derived from this vegetation increase the fertility of the water. The margins of the pond become the habitat of many species of wildlife, and the water may be diverted for farm use. A large number of ponds in any one area is of assistance in the conservation of soil moisture and aids in raising the water table.

As a conservation tool the farm pond has its place in our agricultural economy. Conservation is the wise use of a natural resource. It would not be good conservation to use land suitable for agricultural crops for fish ponds. The primary use of ponds is the conservation of water and the control of erosion to prevent depletion of soil fertility. By wise planning, submarginal land is put to good use in conserving the soil and water resources. With a little additional planned management these same ponds will serve the other purpose of producing a supplementary crop.

The Soil Conservation Service sponsored the construction of ponds for the control of soil erosion as early as 1939. Missouri has actually given financial and other assistance to farmers who were willing to build ponds for the same purpose. But the program which started out with these ends in view has been changed to one for the production of food fishes. The necessity for developing local sources of food has focused attention upon the farm fish pond program.

Ponds such as those described can be built inexpensively with the equipment already on hand. The only additional material required over that ordinarily used is a simple outlet for draining, should the necessity occur. Theoretically ponds stocked with a balanced population should not need restocking provided they are properly fished and fertilized.

The ordinary unfertilized pond will support a small number of fish and will produce a much smaller number for food. As the fertility increases, the amount of fish which can be grown will be increased. The common fertilizers used around the farm are suitable for this purpose and may include whatever materials are the most readily available and cheapest. The only requirement is that sufficient fertilizing substances be supplied and the pond be heavily fished.

Under southern conditions fingerlings stocked in the fall or early spring will be large enough for food by the next fall. In northern climates growth will be less, depending upon the average summer temperature and the length of the growing season. Fertilization fosters the growth of maximum numbers of food organisms and accelerates the growth rate of the fish, thus increasing the turnover of legal fish and making a larger number available for food in a given length of time.

One European author places the production of game fish, such as pike, at between 176 and 320 pounds to the acre in the best ponds on natural food, and the production of trout at 440 pounds to the acre where they are hand fed. The production of carp would average forty percent higher than the 176 to 320 pound average, and for trout would be

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PROGRESS IN PUBLIC REGULATION OF PRIVATE FORESTS

By P. L. BUTTRICK

THE WAR, by vastly increasing demands for wood products and disclosing many new and revolutionary wood uses, has dramatized forest problems as perhaps they have not been dramatized since Theodore Roosevelt's day.

The U. S. Forest Service has repeatedly declared control of cutting operations to be necessary to save private forests from over-exploitation. The Directors of The American Forestry Association expressed themselves in favor of such controls nearly four years ago and have frequently reaffirmed their position. The Council of the Society of American Foresters endorsed the public regulation principle in 1941 and reiterated its stand early in 1943. In 1941, the principle was also endorsed by the Association of State Foresters and was reaffirmed a year later by its western section. The National Lumber Manufacturers Association gave its sanction to the public regulation principle in 1941, but not all forestry industry groups have done so. The Southern Pulpwood Conservation Association, at its meeting in New Orleans in April 1943, opposed federal regulation, but professed an open mind as to the necessity for state regulation. Many forest industry groups have taken no stand on the question.

Nevertheless, there seems to be a concurrence of opinion among most individuals in touch with conditions prevailing in private forests that some form of public control over cutting operations is necessary. Excepting a few outstanding foresters and the official viewpoint of the U. S. Forest Service, the weight of public opinion appears to be on the side of state rather than federal control. With the single exception noted, all of the formal resolutions passed by the organizations mentioned have specifically endorsed state, not federal, regulation.

Advocates of state regulation claim that the states are the logical regulatory agencies, because of their broad powers over land use and taxation, and the fact that they administer forest fire and other forest protection laws relating to private lands. Many of the latter laws are of themselves regulatory even though they do not directly touch cutting practices. Proponents of federal control claim that the issue is national in scope and insist therefore that it must be dealt with by the federal government. They are skeptical of state efforts.

Even though the U. S. Forest Service has long urged federal controls, Congress has failed to enact regulatory legislation. There has, however, been progress on the part of the states—at least so far as law-passing goes. Most of these laws are quite recent, but the oldest dates from 1903. Ten states have enacted regulatory laws; two others define areas where forests may not be removed or must be established.

The following states now have forest regulation laws of some sort. The year of passage is given in parenthesis. Nevada (1903), New Hampshire (1921), Louisiana (1922), Wisconsin (1929), Idaho (1941), Indiana (1941), Oregon (1941), Virginia (1942), Minnesota 1943), Maryland (1943), California (1943), Massachusetts (1943). Michigan and Wisconsin both have forest regulation bills before their legislatures. The odds seem to be against their passage. The following have rejected regulation bills (or they were withdrawn before voted upon): Colorado (1941), Connecticut (1941), Washington (1941), New York (1943), North Carolina (1943), Washington (1943), Vermont (1937 and 1943).

In all, eighteen of the forty-eight states have either passed, considered or are giving legislative consideration to public control of cutting on private forests. Since all but four of the laws now on the books date back at most to 1941, it seems fair to say that this movement is young but rather vigorous.

These laws and bills (regardless of whether they have been enacted) all have the same general objective, namely to keep forests productive to the extent that reproduction will follow cuttings. None attempt to provide for sustained yield. Otherwise they vary widely in scope and method of approach. Some are designed to cope with special problems. Others are limited to specified parts of a state or to certain species of trees or types of forests. Some specify the cutting methods to be used. Others authorize state forestry departments or special boards set up for the purpose to determine harvesting procedures. Some have "teeth" in them; others make no specific provision for enforcement or any effective penalties for noncompliance. Nearly all make provision for forest land clearing for legitimate purposes and for cutting by an owner for his personal use.

The present Indiana and Wisconsin laws are designed to cover special problems not connected with cutting practices, but to prevent forest destruction due to other forms of land use. The Indiana law is designed to insure forestation or reforestation of lands from which the top soil has been removed by strip mining operations. The Wisconsin law sets up zoning provisions for forest lands. Where the soil is nonagricultural, it forbids land clearing for farming. The bill now before the Wisconsin Legislature regulates cutting practices.

The cutting methods prescribed depend in part on the problems faced in reproducing forests in different states. Where the forests tend to an even-aged form and the trees are in consequence all of approximately the same size, operators normally clear cut. To reproduce such a forest it is generally necessary to leave seed trees. Regulatory laws designed to meet this condition specify the minimum size, character and number of the trees which must be left for each unit of area. There is no uniformity as to provisions regarding number and specifications of seed trees. This is as it should be. There is wide variation in the forests of different regions.

Where forests tend to an uneven-aged form, trees of all sizes are encountered on the same area. Here good forestry usually consists in leaving the smaller trees as the basis of a second crop. Regulatory laws designed for such forests specify a diameter limit below which trees may not be cut. Here again the provisions vary to meet conditions encountered in individual states. Some of

them have both kinds of forests, hence they specify different methods for the different forest forms.

It is difficult to phrase cutting rules designed to perpetuate forests without making them either too rigid or too complicated to be workable and effective. There are many arguments, therefore, in favor of either stating methods in rather broad terms and making provisions for competent public authorities to interpret, modify and set such standards of performance as may be necessary to meet unforeseen conditions. Some laws or proposed laws do this, others go further and leave determination of actual methods of cutting entirely to constituted administrative authority, setting forth in the laws themselves only the general objective of keeping forests productive.

Whether the cutting methods are specified by law or by administrative regulations, if they are to be successful the operator must conduct his cutting in such a way that the seed trees or the smaller trees which are left are not destroyed by logging, nor the new stand endangered by accumulation of logging slash. Not all the laws provide for this. Only a few require that seed trees be left standing until reproduction is fully established. In some states the penalties for non-compliance are so light and the responsibility to institute legal proceedings for failure to comply is so ill-defined that an operator ignoring the law does not take much risk.

Forest owners, even those favorable to the general principle of public regulation, have frequently expressed fear lest it be applied in such a way as to raise the cost of their operations beyond the profit margin. Such measures in the end would defeat their own objectives. Successful public regulation must, therefore, require cutting and other methods that are both silviculturally sound and economically feasible for the land owner. In order that the proper combination of knowledge to accomplish this is made use of, some of the states have established special boards to represent all interests concerned with the forest to set up and administer the regulations. These boards are tied in with the existing forestry authorities, the state forester being the administrative officer. Other states have left the administration of the law in the hands of the present forestry commission or state foresters.

It is far too soon to appraise the results of these regulatory laws. But it seems safe to say that the earliest laws are not sufficiently comprehensive and do not provide sufficient "teeth" or administrative machinery to be of particular significance except as they establish the right of the states involved to regulate cutting practices on private forests. They seem, in fact, to have been practically inoperative from the start. Taking the earlier and later laws together they should be considered as a beginning in an uncharted field in which no one has a right to be dogmatic and where there is much room for experimentation and much need for experience. Some of the recent laws, notably the Oregon law of 1941 (with 1943 amendments) and the Maryland law of 1943, are the most advanced and have sufficient flexibility to meet local administrative and forest conditions. Progress must come not alone by getting more laws enacted but by improving existing ones.

Nearly every country in the world where forests are important has found it necessary to apply some sort of public control over their exploitation. Those favoring it in the United States are divided into two schools—one holding that controls should be applied by the federal government, the other insisting that control is a state matter. So far state control advocates have made more progress. Ten states now have forest regulation laws. They are California, Idaho, Indiana, Louisiana, Maryland, Massachusetts, Minnesota, New Hampshire, Oregon and Nevada.

The Association of State Foresters has given much thought to the general framework on which a state forest regulation law should be drafted. A committee of that Association has drawn up a model regulatory bill the essential features of which are condensed in Mr. Merrill's article on page 396 of this issue. Despite the great disparity of forest conditions and administrative setups in the different states, this model bill appears to be a sound starting point in drafting new or revising existing regulatory legislation. Such legislation, regardless of its form, is a part of general forest legislation. Its successful functioning will depend upon the adequacy of forest fire, insect and fungus disease laws and their enforcement, the soundness of the system of forest taxation, and the competency of state forestry bodies.

This last point was not overlooked by the proponents of the Washington law which failed of passage in the 1943 session. It was introduced along with other legislation designed to strengthen the state forestry department. Likewise, the interrelation of regulatory with other forest laws was realized by the New Hampshire Legislature which, in its 1943 session, provided for creation of a special commission to study and recommend changes in forest taxation laws and to recommend further legislation for public regulation of cutting on private lands if they seem to them to be necessary.

Regardless of laws present or prospective, if state regulation is to be effective, it must be administered by state forestry organizations that are well established and financed units of state government, free from political influence and staffed by competent foresters. It may be said without the slightest disparagement of state forestry as a whole that some of the states do not yet have forestry organizations meeting these standards. All those who believe in state rather than federal regulation have the obligation to help build up state forestry organizations adequate to meet the responsibilities with which they propose to entrust them.

It is also well to remember that the forestry problem is national in scope. From this viewpoint, what happens to the forests in certain states and groups of states is of major significance. Recent passage of a regulatory law in Massachusetts does not counterbalance failure to enact one in the State of Washington. Massachusetts, even should its forests be developed to the maximum, could not supply a large volume of forest products to the rest of America. Washington is one of the great lumber producing states. Its forest products are nationally distributed.

At present, and probably for many years, the forests of the far West and the South will remain the most important timber producing areas of America. Regionally, the far West is more nearly covered by state regulation than any other part of the country. In the South, second in commercial importance of the great forest regions, state regulation has scarcely made a start.

Until at least these two forest regions are covered by adequate state regulatory systems which are enforced, advocates of federal regulation are not likely to be overly impressed with talk of states rights or arguments that states are the logical regulatory units. They will also continue to point out that unregulated cutting cannot continue indefinitely if we are to put our forest house in order.

The advocates of state regulation, therefore, cannot rest on the progress shown which is at best isolated and immature. Further progress depends not alone on their efforts but on the attitude of forest land holders and the forest industries. Few forest land holders enthuse about regulation—state or federal. No one likes to be regulated. An increasing number of them are handling their lands in a satisfactory way. They may claim not to need regulating. Some who are liquidating their holdings do not relish making expenditures for the benefit of posterity. Individuals among

them may give lip service to state regulation because they think it will be easier to "get around" than federal.

The more farsighted leaders in the forest industries see two things quite clearly: (1) The future of their industry lies in mass production of forest crops; (2) the producer of growing timber is at an immediate economic disadvantage compared with this competitor who is liquidating his capital asset. These farseeing men, therefore, are not likely to oppose regulation on any sound silvicultural and economic basis. They prefer it on a state basis which will bring controls closer to the forest; if that does not work out they will probably not oppose it on a federal one.

ESSENTIALS OF A STATE FOREST REGULATION LAW

By PERRY H. MERRILL

IN THE summer of 1942 the Eastern Conservation Committee of the Council of State governments designated the state foresters of the North Atlantic states as a committee to work up uniform forest legislation. Among other things the committee adopted a policy in regard to public regulation which with minor changes was approved by the council's legislative representatives from the several states and embodied in a model bill approved by the legislative representatives of the North Atlantic states at the Sixth Eastern States Conservation Conference at Boson on January 15, 1943.

The statement of the committee as to the contents of a model law is as follows:

"1. *Statement of Policy.* A statement of policy emphasizing the public interest in forest lands and the desirability of long term forest management purposes should be incorporated in such bill, the language to be left to each state to work out for itself.

2. *Definitions.* It was agreed that there should be a set of definitions embracing such terms as: natural resources, woodland, state and district boards, landowner, persons, forest products, cords, the unit of measure or log rule to be employed, and the definition of permittee and licensee.

3. *State Forestry Board.* Composition. It was agreed that where practicable, use should be made of existing forestry boards or boards managing the department of conservation, provided that the personnel of such board contained adequate representation of the various forestry interests involved.

Where such was not the case, the committee inclined to recommend the creation of a new board, the chairman of which should be the chairman of the managing board of the department of the commissioner, if the department was headed by such. It was agreed that representation on the board should consist of persons representing: (1) Owners of commercial forest lands; (2) Owners of farm forest lands; (3) Pulp and paper industry; (4) Lumber producing industry; (5) Citizens' conservation groups. It was recommended that the executive officer of the board should be the state forester or similar officer of the state.

4. *Powers of Board.*

1. Subject to modifications in arrangement, it was agreed that the powers of the board should include power to: (1) Issue rules and regulations to cover forest practices, such rules to be promulgated after public hearing; (2) Require the filing of statistics of cut; (3) Issue licenses governing conditions of cut; (4) Permit employees of state and district boards to enter in upon and inspect woodlands; (5) Direct district board activities; (6) Hear appeals from decision of district boards.

2. In connection with the appointment of regional boards, the state board shall endeavor to secure the same distribution of interests as are represented in the state board itself, namely, representatives of commercial forest lands, farm forest lands, the forest industry predominant in the district, and citizens' conservation groups.

3. Such district boards should have power to adopt rules after public hearing.

4. The executive officer of the district board should be a forester supplied by the Department.

5. District boards should develop particular local policies and have authority to pass upon specific management plans.

6. When such specific management plans are accepted by the district board, procedure thereunder should be regarded as equivalent to compliance with the district rules.

7. Members of district boards should be paid a *per diem* fee smaller than that of the state board and their necessary expenses.

5. *Duties of Private Owners of Forest Land.* In general, there should be placed upon all owners the duty of leaving conditions favorable for regrowth.

1. All forest land on which lumbering operations are conducted after the passage of the act should be left by the operator in a favorable condition for regrowth with the object of maintaining sufficient growing stock to provide raw material for industry and to furnish employment to forest communities continuously, if possible, or at least without long interruption.

2. Young growth. So far as practicable, all desirable seedlings and saplings should be protected during logging operations.

3. Restocking land after cutting. Minimum standard practice should require the leaving of trees of desirable species of suitable size singly or in groups, well distributed, and in such numbers as to secure restocking. Provision should be made for clear cutting when approved by the district board.

4. Leases and timber cutting rights. The act and all rules and regulations promulgated thereunder should apply to the owner of the land or the stumpage and to persons whose operations are in timber, trees, or wood held under lease or cutting rights at the time of the passage of the act. Provision should be made that in administering the act due consideration should be given to the ownership equities existing when the law becomes effective in order to avoid unreasonable hardship, but any such leases or cutting rights entered into after the passage of the act should be unreservedly subject thereto."

(Copies of the model bill mentioned above may be obtained by addressing a request to Mr. Perry H. Merrill, President, Association of State Foresters, State Forest Service, Montpelier, Vermont.—Editor.)

Editorial

A Climatic Hazard

TO MENTION sleet storms in August may seem unseasonable. Nevertheless, thoughts of a landscape of trees clothed in ice may help to take the mind off the heat of midsummer. The real purpose, however, of publishing Mr. Gooch's article, "Winter Sleet Storms," in this issue and of commenting on it editorially is to direct attention to one of the many hazards which hang over the path of the private individual in the long-time management and growing of forests. Storms, like forest fires, are a private forestry hazard from which the owner has no recourse, because storm and fire insurance on growing forests is not written.

Sleet or glaze storms, no less than summer tornadoes, frequently cause great damage to forests in various parts of the United States, chiefly along the Atlantic Seaboard, in the South, and in the Lake States. Sometimes they are localized and sometimes widespread. Always they attract much attention. The sight of woodlands, shade trees, orchards and pole lines sheathed in ice is undeniably beautiful. Photographers, professional and amateur, flock to the scene. Rotogravure supplements, photograph exhibitions and news reels attest the result of their labors, but owners of damaged shade and orchard trees call frantically on state foresters and experiment stations for advice as to how to repair the damage from broken limbs and split crotches. Woodland owners shake their heads, knowing that situated as they are little can be done.

Presently the ice melts. Pole lines are repaired, broken branches and down trees are removed from the highways, shade trees are repaired — sometimes well, more often badly. Life returns to normal and the storm is generally forgotten.

Only those having occasion to go into the woods see the dense litter of broken tops, snapped off branches, bent over and fallen trees, and realize the loss to timber and increased fire hazards due to these Acts of God—to use the insurance man's term. The best the forester can do is to clear up wreckage and salvage what he can. If this is done, after a few years only the expert can detect that anything has happened but he knows that half a century may be required for the loss in growth to be restored. Clean-up and salvage are expensive at best and economically possible only when market and labor conditions are favorable—sometimes not at all.

It is scarcely to be expected that men will ever be able to "put out" an ice storm as they do a forest fire, or even mitigate its severity as they can insect and fungous attacks on forests. Such storms will remain a real and uncertain hazard to timber growing that may wipe out in part or in whole private forestry undertakings of years' standing.

Mr. Gooch in his article on last year's glaze storm in Virginia and Maryland suggests that somewhat the same sort of federal assistance in salvage work be offered to timberland owners there as was extended to those in the New England hurricane zone a few years ago. Since much of the area lies in the coastal zone where the Army is desirous of having special protection for military reasons, federal money from the emergency fire protection funds might with propriety and good effect be spent to reduce the fire hazard by cleaning up debris left after this storm.

Sleet storms are to be classed with hurricanes as natural hazards to forests. Hurricanes invade forests less often but are more devastating when they do come. It has been suggested that there are enough past records of hurricanes so that risk-rates for forest insurance against storm damage might be developed, but little progress in this direction has been achieved. The insurance hazard, apparently, is too great, or at least not yet sufficiently studied. This being the case, Mr. Gooch's suggestion that federal aid be extended in such cases as part of a national forest policy, just as it is in the case of forest fires and as it was extended so successfully in the case of the New England hurricane of 1939, is much in point.

Perspective of Time

THE words of Dr. John C. Merriam, president of the Save-the-Redwoods League, in a recent address before that eminent body, fall as pearl-drops of wisdom upon a war-parched world. Reflecting upon the calm and antiquity of the redwoods, his thoughts turned to the peace conference that will pattern the world when the last shot of the present war is fired.

"It may be," he said, "that for the statesmen who settle these great questions (of the peace conference) in which time is a critical element we should recommend a sojourn of at least a few hours in a redwood temple, where time must be faced and in some measure appreciated."

Recalling that "the regular thing is to hold a peace conference in some elaborate environment of man—a Hall of Mirrors at Versailles, after the last war, in the effete and luxurious court at Vienna after the Napoleonic Wars:"—the San Francisco *Examiner* observes that "the prospects for the next peace conference indicate Washington will be the location."

Then, looking upon Dr. Merriam's words as "the best suggestion yet for the location of the peace conference," the *Examiner* asks editorially:

"Why not in a solemn forest? Along the Redwood Highway are trees that sprung from cones when Christ walked the earth, that were great when Napoleon was great — and they are still great. There, indeed, would the statesmen feel their little period on the stage of life set in its true perspective of time.

"Of course the peace conference won't be held at Bull Creek Flat—but it should be in some such place, or at Yosemite or the Grand Canyon—where man would feel how humble he is before the might of ages."

This is well said. Our great national parks which, Director Newton B. Drury in the lead article of this issue pictures in their wartime role, are, like the redwoods, solemn courts of ageless peace. There in solemnity of thought, amid the creative works of Nature, one may come to know time's true perspective.

YOUR SHADE TREES:

Greedy Roots—Vice or Virtue?

By L. E. MANNING

THERE is a song about the "Ivy Green" whose roots crept into the cellar and found the wine casks. Certainly roots have been known to do strange things—cast-iron pipes two feet through have been broken; masses of rock weighing tons have been overthrown by trees taking root in crevices; lawns under certain old trees have been so filled with roots that it would seem more proper to use a plane than a lawn-mower!

Five common trees—the elms, maples, beech, poplars and willows—have acquired a notoriety in this respect which has been the subject of much warning by experts and avoidance by would-be planters. The warnings are justified, but there is another side to it. Greedy roots are an outward and visible sign of an inward virtue in shade trees—the lusty, vigorous will to thrive. Possibly this virtue has too often been insufficiently weighed against the more spectacular vice.

Consider how many times quick growth is useful; or ability to grow vigorously in soil that simply cannot be properly cultivated and fertilized, for one reason or another. In burned over country, for instance, or on the prairies, the poplars are always the first trees. On the other hand consider the great beauty of the American elm and ask if it is not worthwhile to consider how it may be planted so that its charm may be added to lawns and gardens.

There are two general types of root-greediness—those which fill the soil at the surface so full of roots that nothing else can grow, and those whose roots are so thirsty and vigorous as to break water mains and sewers. Let us consider their faults and virtues and try to determine methods for their safe use.

Lawn-chokers: elm, maple and beech

The elms most suitable as shade trees are three in number. Of these the handsomest, American elm, is typically slow in youth although a variety called Moline is of much faster growth. An old tree in an ordinary lawn will present a problem, for no grass can be made to grow except by adding an inch or two of topsoil each year. Yet here is one of the handsomest trees in America, and safe uses can be found by the score: Set in wide avenues without grass it is entirely satisfactory; set in the edge of woods, a little back, it provides a fine background and the barren earth beneath it can be screened by surrounding shrubbery. Lastly, the elm is one of the few trees to thrive in damp, even swampy soil, and in such a situation it is much less root-greedy, for it is then under no necessity to find water.

The Scotch or English elm (*campestris*) is quite different in appearance,—more like an oak, and suitable to smaller areas, but its uses are the same as American elm with one exception—it can withstand impure city air very much better.

The third important elm is the Siberian or "Chinese" (*pumila*). This is very fast growing if in sandy soil, but a small tree compared to the other elms. It is definitely less root greedy, but not nearly so handsome. Its chief usefulness is for rather dry locations and climates. Like all elms, the number of insect pests is legion but, on the other hand, the ability of the tree to thrive in spite of them is amazing.

The American and European beeches are essentially alike, though the European has a number of forms such as weeping and purple-leaved. They permit absolutely nothing to grow beneath, but are usable even in a lawn because they branch very low and should not be pruned to a head, but so grown that the branches come down to the grass all around, making a huge pyramid of leaves that is beautiful, trouble-free and of lusty growth. American beech insists on pure air while the European does not.

Norway maple is probably the most commonly planted shade tree in America today. Its chief virtue outside of

MAPLE

AMERICAN ELM

WILLOW

Greedy-rooters all, but who would not gladly make the necessary effort to cultivate, feed and renew the soil beneath in order to add their beauty and charm to his garden?

city streets is its ability to grow well and transplant readily even in large sizes. Its shade is too dense and its roots the greediest of all, so that no grass will grow under a specimen of forty years or more. Only under difficult conditions, as at the seaside, is its use justified.

The silver maple is rapid in growth, also easy to transplant, also root greedy, but is too weak of limb and droopy of branch to be fully satisfactory except where speed is essential. The red or swamp maple, on the other hand, is a desirable tree in spite of drooping branches because of its ability to withstand really damp conditions—thrive in them. It will live in drier locations, but lawn will not grow beneath an old specimen.

The sugar maple, however, is deeper rooted than other maples and, provided shade-loving grasses or plants be used, some greenery is possible beneath it. It is the largest, strongest and far the handsomest of all maples that are used for shade. Its limitation is fresh air—cannot abide soot and smoke. It is lusty enough to tolerate it for a longer or shorter period but is not satisfactory in cities as a rule. A close relative, the black maple (*nigrum*) looks much like it (produces more and better sugar, too) yet is able to thrive in moderately clean cities. Foliage is a little duller and as a result the tree is not much in demand and hard to find in commercial nurseries.

Pipe-crackers: poplar and willow

The poplars must all be kept away from streets and pipes. They have three general faults, root greediness which cracks water pipes or heaves sidewalks, sufficient surface roots to harm lawns, and weak branches. In addition some kinds are being destroyed by the poplar canker. In spite of this, their ability to grow rapidly in poor conditions makes it necessary not to dismiss them too lightly. The aspen group of poplars,—quaking and largetooth aspen, are the worst root offenders, but fairly strong-limbed and free from canker. Their use in lawns or near pipes is to be avoided, but as specimens in woods or near the edge of woods they are very satisfactory companions,—seemingly alive with motion in the slightest breath of breeze.

The common Carolina poplar has no virtue except quick growth and should be avoided, but the similar appearing silver poplar is a fair tree and lawns can be grown under it, though occasional suckers do appear on the roots. It is not so badly affected by the canker as the Carolina poplar.

Among the upright forms, the question of grass is unimportant, for the branches come to the ground and grass can be grown up to the branches. However, the popular Lombardy poplar is being destroyed by the poplar canker. Bolleana, a varietal form of silver poplar, is better, and there is a fastigiate form of Simon's poplar which is still less affected by the canker.

The willows are apt to make weak branches and drop leaves and litter, but their root greediness is largely a matter of pipe-cracking and then only in fairly dry soils. Few of them will stand actual wetness, popular opinion to the contrary, but they do like cold, damp soils and make handsome lawn specimens—particularly the weeping forms, requiring only the pruning out of weak surplus suckers to keep them fairly clean. Kept away from streets and pipes they present no problems. The old-fashioned white willow (*alba*) is the one that will actually grow in water. It has forms with yellow branches and red branches. It suckers worse than any other willow.

Babylonian is the best known of the weeping willows — it is a hybrid, and from it has come another weeper—the Wisconsin weeping — which is more hardy, vigorous and spreading.

PACHYSANDRA

Evergreen miracle plant — will cover bare, unsightly places under root-greedy trees with a rich carpet of green

Making the best of old established trees

To protect pipes against cracking is usually hopeless but if it is possible to coat the pipe with asphalt so that absolutely no moisture leaks, and so that the surface is not cold enough to condense soil moisture, then the miracle can be accomplished. Practically, it is usual to sacrifice the tree or re-lay the pipe.

Lawns under elms and maples also present a difficult problem. One can plant shade-enduring grasses and top-dress with fresh soil each year. This is never-ending, but *does* work. Or one can plant such permanent shade-loving plants as pachysandra, or vinca minor, which thrive in poor soil, and except in the worst cases some greenery can be maintained. Some less known plants will do a good job also—*Sarcococca*, for instance, will grow among dry surface roots in dense shade. The common "wild" ground ivy (*Nepeta hederacea*) also will make a passable carpet.

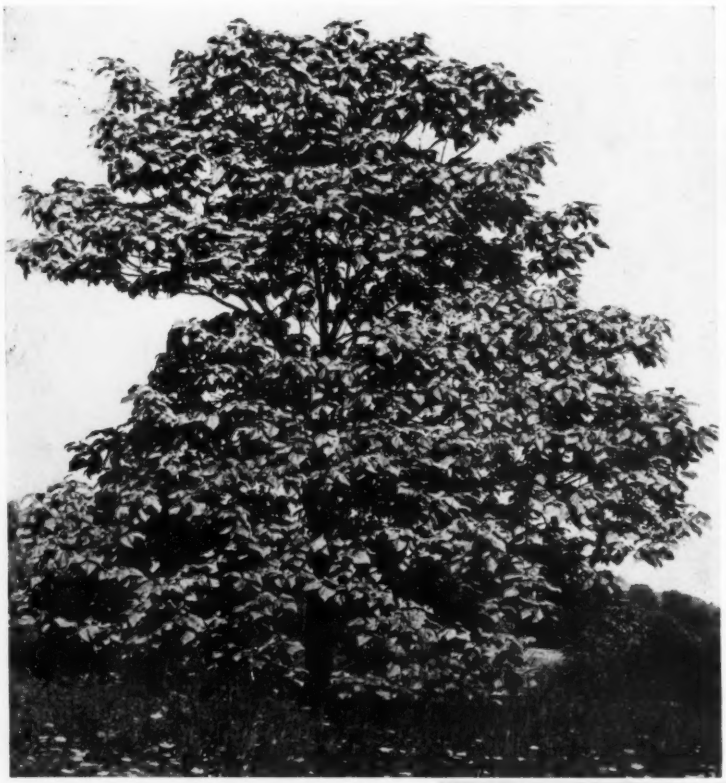
Garden beds near old trees are constantly encroached upon by roots. The only cure here is to dig a long, narrow deep trench, cutting all roots, and sink a board on edge, or metal curbing when available. But roots soon grow beneath this obstruction and come up to the surface beyond it. One successful and permanent cure is a poured concrete wall sunk three feet into the ground. This may seem like a lot of trouble and expense, but if you are like most tree lovers, almost anything is worth while to keep the old tree.

If you are just now planning to plant trees and want one of the greedy trees—beech, elm, maple, poplar or willow—pick the right one and put it in the right spot. You can avoid all trouble by taking a little forethought.

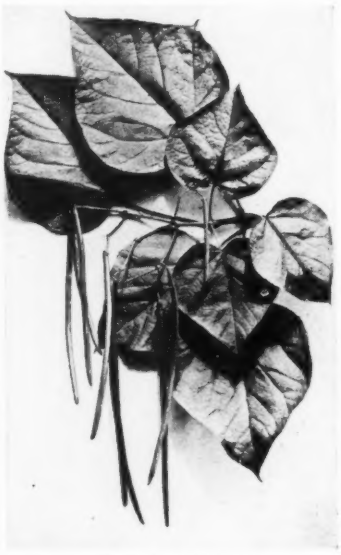
NORTHERN CATALPA

***Catalpa speciosa*, Warder, Engelmann**

By G. H. COLLINGWOOD



Though sometimes a hundred feet high in the forests of its natural range, Northern Catalpa is usually a medium sized tree with a broad, spreading crown



Large heart-shaped leaves and long slender seed pods make Northern Catalpa easy to recognize

In winter the long pods are often conspicuous, dangling in clusters, and rattling in the wind

THE word *catalpa* is a Cherokee Indian name adopted by the early settlers of this continent, and *speciosa,* a Latin word meaning ornamental, has been given this irregular and picturesque tree with large decorative leaves and conspicuous flower-clusters.

In the northeastern states planted trees reach twenty-five or fifty feet in height with a trunk diameter of six to fifteen inches. The range of northern catalpa extends around the juncture of the Ohio with the Mississippi. Along the rich bottomlands of the Ohio basin in southern Illinois and southern Indiana it attains its maximum size of a hundred and twenty feet with diameters of four or rarely five feet. When growing in the open, the trunk is short and usually crooked, the crown broad and spreading with thick scraggling branches. In the forest it is taller with a narrow rounded crown and a straight, slightly tapering trunk that is sometimes clear of limbs for sixty

feet. In deep, moist, fertile soil northern catalpa grows rapidly, maturing in one hundred years or less. It is tolerant to some shade, and seedlings require only partial sunlight.

It has been widely planted in the eastern half of the United States as far north as Massachusetts. Never forming pure stands in the forest, it is found singly or in small groups associated with other bottomland hardwoods.

Bark on the mature trunk is three quarters to one inch thick, light grayish brown, broken into longitudinal, scaly, flat ridges. Twigs are stout, smooth or downy, yellowish or reddish brown with large conspicuous lenticels, and large leaf-scars. The small lateral winter buds are embedded in the bark and covered with overlapping scales. Terminal buds are absent, and the tips of twigs in the north are often winterkilled.

The large leaves, which are almost tropical in appearance, are borne on stout cylindrical stems four to six inches long, grow opposite, whorled, or three in a group, and measure seven to twelve inches in length and five to eight inches in width. They are long-pointed at the outer end, round or heart-shaped at the base, with even edges, or one or two teeth. Mature leaves are light green and smooth above, slightly paler and hairy beneath, and at the axils of the primary veins they have clusters of dark purplish glands which are visited by honey bees. Leaves turn black and fall after the first hard frost.

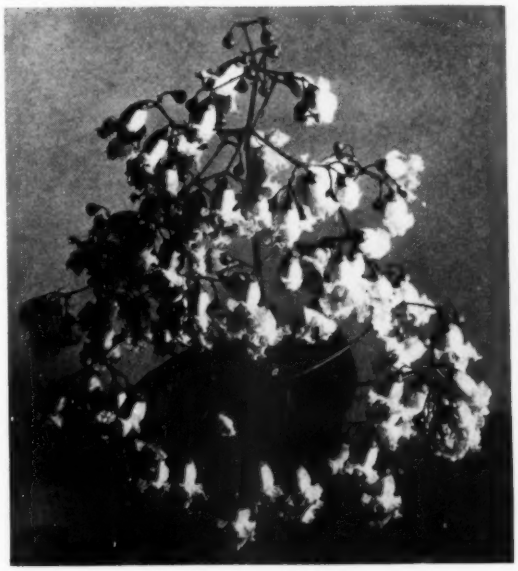
Appearing in June or early July, the showy flowers, borne on slender terminal stalks, are arranged in pyramidal, few-flowered clusters five to six inches long.

The fruit ripens in autumn. It is a slender two-celled bean-like, cylindrical capsule ten to twenty inches long and one-half to three-quarters inch thick, suspended by a thick stem. Green when young, the pods later turn dark brown and remain on the tree during the winter. Toward spring they split in half liberating the many flat, winged, oblong seeds.

Catalpa wood when dry weighs twenty-six pounds to the cubic foot. It is coarse-grained, soft, not strong, but very durable in contact with soil. The heartwood is grayish brown occasionally tinged with lavender, and the thin sapwood is nearly white. It is ring-porous, and, when cut at right angles to the pith rays, resembles ash. Probably nine-tenths of all catalpa cut is made into fence posts, though occasionally it is used for handles, picture frames, interior finish and furniture.

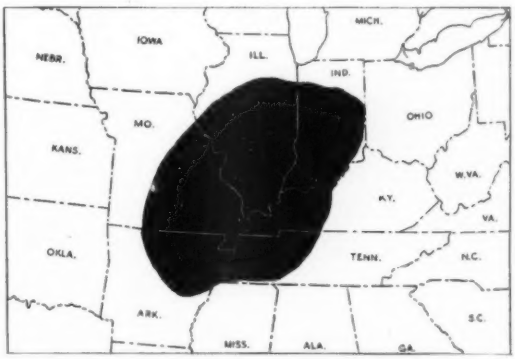
Often severely injured by frost, its brittle limbs broken by wind, attacked by fungus, and by insects such as the catalpa sphinx, it is, nevertheless, one of the easiset hardwoods to plant. It is widely grown in parks, or along suburban streets in the eastern half of the United States.

Northern catalpa is frequently confused with the smaller common catalpa, *Catalpa catalpa,* of the South Atlantic states from Georgia to Mississippi. Common catalpa has dense clusters of flowers thickly spotted with brownish purple as compared with the more open and less conspicuously spotted flower panicles of hardy catalpa. The leaves of common catalpa are smaller, and broader in relation to their length, being only five to six inches long and four to five inches wide. The six to twenty inch long seed pod is more slender and the wells thinner than that of northern catalpa.



The white flowers bloom in June or July, and are arranged in showy, erect clusters at the ends of twigs

Bark on the lower trunk of mature trees is three-quarters to one inch thick, light grayish brown, broken into scaly, flat ridges



Natural range of Northern Catalpa

Andrews Named North Pacific Regional Forester

HORACE J. ANDREWS has been appointed regional forester of the North Pacific Region of the United States Forest Service, with headquarters at Portland, Oregon, succeeding Lyle F. Watts,

Horace J. Andrews

who became chief of the Forest Service early this year.

Prior to his appointment Mr. Andrews was assistant regional forester in charge of the Division of State and Private Forestry in the North Pacific Region.

At the same time it was announced that Charles L. Tebbe, since 1939 assigned to the Forest Service divisions of Information and Education, and Private Forestry at Washington, D. C., had been appointed assistant regional forester at Portland, succeeding Mr. Andrews as head of the region's state and private forestry division.

Mr. Andrews has been associated with the North Pacific Region since 1930 when he was placed in charge of the Pacific Northwest Forest Survey project, part of the nationwide survey of forest resources by the Forest Service. Prior to that he was engaged in private forestry work in the South. A native of Michigan, Mr. Andrews holds two degrees from the University of Michigan.

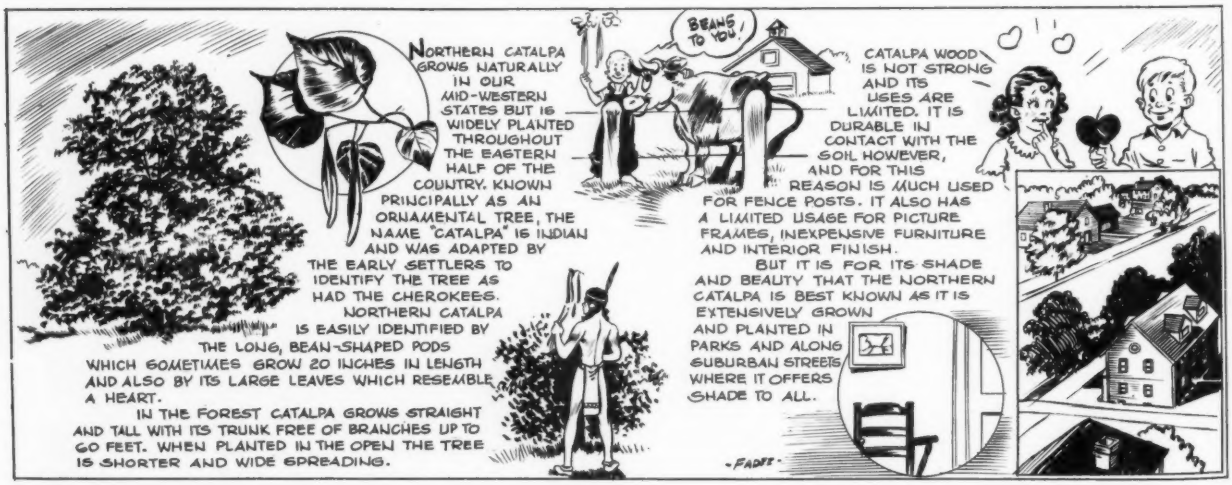
Mr. Tebbe entered the Forest Service in 1934 at the California Forest and Range Experiment Station, later being assigned to the Division of Forest Management of the California regional office at San Francisco. Recently, at Washington, he has been working on the forest products requirements and supply project as an adviser and consultant to the War Production Board and to industrial organizations on questions dealing with the lumber industry, equipment and means to obtain maximum production. He was graduated in forestry from the University of California in 1929.

The North Pacific Region includes Washington and Oregon, states which contain most of the nation's remaining old-growth timber, and which are supplying a major part of wartime lumber demands. The region includes twenty important national forests which last year supplied more than a third of the timber sold from all national forests. They also provide seasonal grazing for

Charles L. Tebbe

a million head of livestock, protect the watersheds of some of the country's largest power developments, and in normal times provide recreation for more than two million people each year.

TREES AND THEIR USES—No. 76—NORTHERN CATALPA


NORTHERN CATALPA GROWS NATURALLY IN OUR MID-WESTERN STATES BUT IS WIDELY PLANTED THROUGHOUT THE EASTERN HALF OF THE COUNTRY. KNOWN PRINCIPALLY AS AN ORNAMENTAL TREE, THE NAME "CATALPA" IS INDIAN AND WAS ADAPTED BY THE EARLY SETTLERS TO IDENTIFY THE TREE AS HAD THE CHEROKEES.
NORTHERN CATALPA IS EASILY IDENTIFIED BY THE LONG, BEAN-SHAPED PODS WHICH SOMETIMES GROW 20 INCHES IN LENGTH AND ALSO BY ITS LARGE LEAVES WHICH RESEMBLE A HEART.
IN THE FOREST CATALPA GROWS STRAIGHT AND TALL WITH ITS TRUNK FREE OF BRANCHES UP TO 60 FEET. WHEN PLANTED IN THE OPEN THE TREE IS SHORTER AND WIDE SPREADING.
BEANS TO YOU!
CATALPA WOOD IS NOT STRONG AND ITS USES ARE LIMITED. IT IS DURABLE IN CONTACT WITH THE SOIL HOWEVER, AND FOR THIS REASON IS MUCH USED FOR FENCE POSTS. IT ALSO HAS A LIMITED USAGE FOR PICTURE FRAMES, INEXPENSIVE FURNITURE AND INTERIOR FINISH.
BUT IT IS FOR ITS SHADE AND BEAUTY THAT THE NORTHERN CATALPA IS BEST KNOWN AS IT IS EXTENSIVELY GROWN AND PLANTED IN PARKS AND ALONG SUBURBAN STREETS WHERE IT OFFERS SHADE TO ALL.
-FADIT-

It takes more than a cone to produce a crop of timber

BEFORE IT FALLS to the forest floor, the cone has released the tiny seeds from which grow the giant trees.

It takes more than seeds, and sun and moisture to produce the needed crops of timber so valuable to society. *Good tree farming is also required.*

Provident forest management is following the modern practice of successive timber cropping. Management is preventing fires, fighting insects and disease which have consumed far more of our timber supply than was ever used to build churches, schools, or homes. In the great Northwest there will probably be no vanishing timber line pushed back by the plow of the farmer. This is forest land, best suited economically for timber farming, and reserved by its owners for that exclusive purpose. A great, continuously renewing natural resource can provide future generations with all the benefits of wood. Because timber is a crop, the seeding and harvesting of wood can go on indefinitely.

WEYERHAEUSER FOREST PRODUCTS — TIMBER IS A CROP

WEYERHAEUSER

WOMAN OF THE FOREST

By E. B. LOOSLEY

WITH the nation at war and the greatly increased danger of incendiary fires, control lines in the forest must be tightened. Depleted manpower forces the replacement of many men fire lookouts with women who qualify. One such—Mrs. Alice Hamilton, veteran camper, of Klamath Falls, Oregon, who is sixty years old, has proved her ability. When it became necessary, owing to war conditions in 1942, to send the man in charge of the Huckleberry Lookout to a more vital spot, she was offered the job and for the last months of the fire season daily climbed the one hundred-foot steel tower which tops Huckleberry Mountain. During daylight hours she watched the surrounding timbered Cascade terrain. The mountain is only five thousand feet high, and though there are higher lookouts, few are more important. None overlook territory more subject to fire from careless human use, and too, there is always the danger of sabotage. Last summer the only Japanese incendiary bomb dropped in the Pacific Coast Range fell not far from Mrs. Hamilton's location.

Mrs. Alice Hamilton, woman of the forest, greets a ranger. (Right), one of the bears she shot while on duty

From this lookout she gazed down on dozens of large and small streams that join Union Creek, which in turn flows into the famous Rogue River. These rills, rivulets and brooks are a complicated network; they drain little glades and precipitous canyons that lure the fisherman, logger, game hunter, tired office man, sheep and cattle man—all, regardless of their intentions, — fire hazards.

The mountain, so named for its renowned ten square miles of huckleberry brush where five thousand pickers come over some week-ends with jars and cans and drying apparatus, or equipped to pick commercially, is teeming with fire dangers. And lightning is an added peril.

Mrs. Hamilton retained her established camp near the Lookout for living quarters in 1942. It is difficult to protect provisions from marauding bears, and last year she was compelled to kill six of these prowlers, which sounds formidable. But she is not formidable. She is soft spoken, with gentle manners and greying hair. One night she had come down from her duties "dead tired" —a drenching rain was turning to snow when she heard bears outside her tent, but she was too weary — or so she thought — to attempt to drive them away. In fact, she was preparing to retire when an immense bear tore its way into the tent. Her pet fox terrier was mortally afraid of bears. He put up a false-face attack which annoyed Bruin. The dog ducked for the rear flap, the infuriated bear pursuing. Here her other dog, a fighter, grabbed the bear's hind leg. The beast, enraged, turned and took a powerful swoop at Mrs. Hamilton, barely missing the lighted lantern and red hot stove. Mrs. Hamilton was cornered, but she was armed with a thirty-two special.

"I got him," she said tersely.

"How many shots?"

"One; I never waste ammunition."

Thus Alice Hamilton, woman of the forest. The forestry office realizes she can take care of herself. She knows the timbered area of Oregon, its mesa and flat sagelands; its moods, storms, flora, wild fruits and game—she is well armed for life in the open. She quickly grasped the use of the fire finder, a mechanical device in operation for determining the location of fires, similar to an engineers' transit. The instrument has three main parts, base board and track; lower and upper plate—the latter a disk graduated into three hundred and sixty degrees with zero a true north and south line. A map is mounted on top of this plate, the lookout's location at center. A movable sighting ring with vanes for determining horizontal and vertical locations is mounted on a graduated plate. By means of a steel tape attached diametrically from opposite sides and with the aid of the map, the distance from the lookout tower to the fire is arrived at, also any landmarks determined. All this she put down on a required form as she obtained it, then made the report to the dispatcher—in her case Union Creek, nine miles away. She explains the dispatcher's use of the protractor, and the vertical angle scale used in conjunction with a panoramic photograph to strike a level—all of which she understands thoroughly. The forest lookout must be will initiated. Ground-hugging dust from a caravan of picnickers, or even a column of dust that spirals from a band of sheep may resemble smoke, but nothing suspicious must be overlooked.

Mrs. Hamilton did such a good job last year that this summer she has been stationed at Mt. Stella, with Mrs. Caroline Hoskins, a young woman assistant, doing airplane spotting as well.

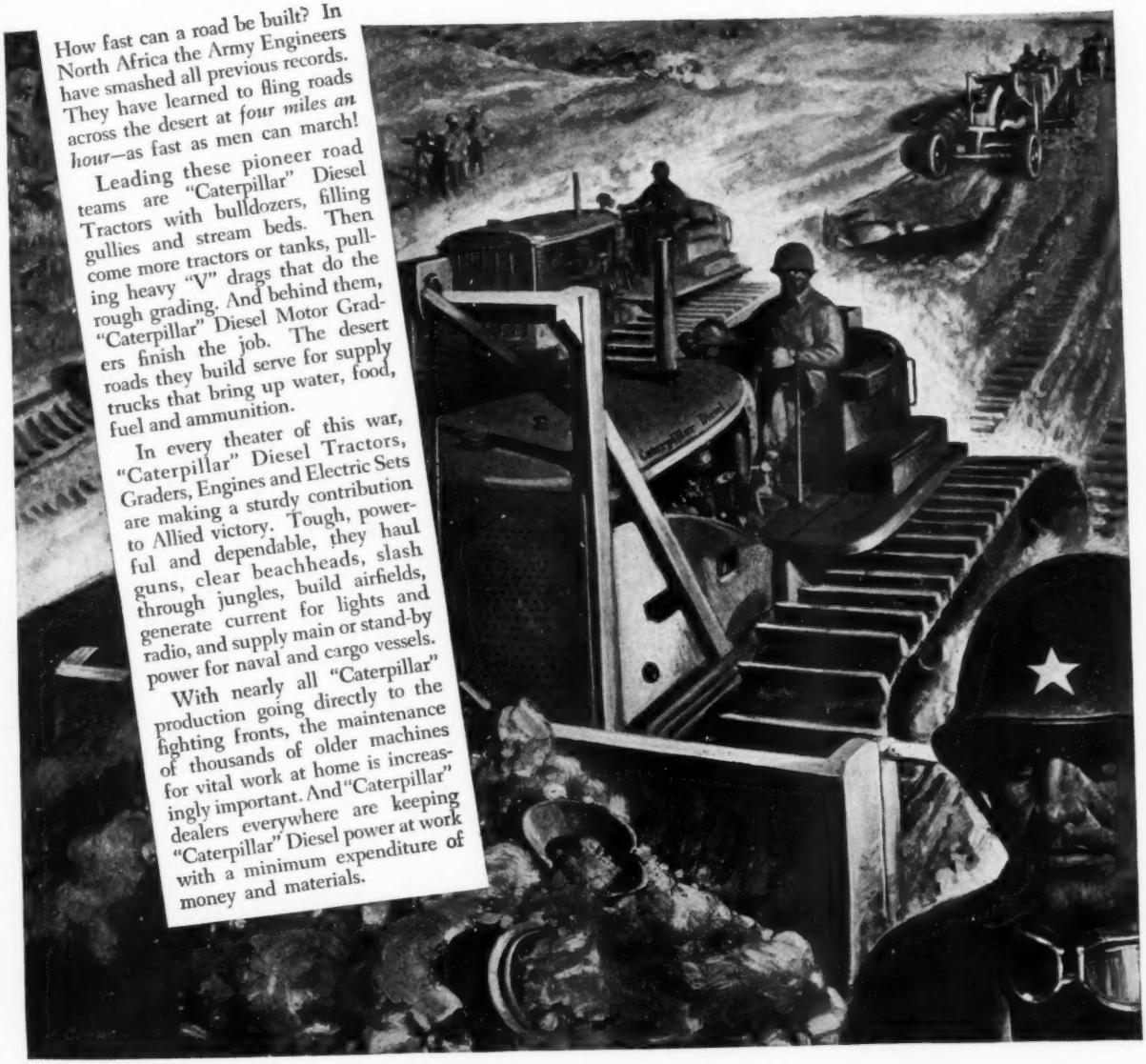
AS FAST AS TROOPS CAN MARCH

How fast can a road be built? In North Africa the Army Engineers have smashed all previous records. They have learned to fling roads across the desert at *four miles an hour*—as fast as men can march!

Leading these pioneer road teams are "Caterpillar" Diesel Tractors with bulldozers, filling gullies and stream beds. Then come more tractors or tanks, pulling heavy "V" drags that do the rough grading. And behind them, "Caterpillar" Diesel Motor Graders finish the job. The desert roads they build serve for supply trucks that bring up water, food, fuel and ammunition.

In every theater of this war, "Caterpillar" Diesel Tractors, Graders, Engines and Electric Sets are making a sturdy contribution to Allied victory. Tough, powerful and dependable, they haul guns, clear beachheads, slash through jungles, build airfields, generate current for lights and radio, and supply main or stand-by power for naval and cargo vessels.

With nearly all "Caterpillar" production going directly to the fighting fronts, the maintenance of thousands of older machines for vital work at home is increasingly important. And "Caterpillar" dealers everywhere are keeping "Caterpillar" Diesel power at work with a minimum expenditure of money and materials.



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REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

CONSERVATION IN CONGRESS

FORESTRY and other conservation appropriations granted by Congress before recessing on July 8 are somewhat lower than those for the past fiscal year as well as recommendations of the Budget Bureau (see table at right). They represent, however, considerable increases in certain items, notably for forest fire protection.

Regular and special wartime forest fire protection appropriations were in a state of confusion for some months as to whether emergency appropriations for forest protection in strategic coastal zones should be included in a War Department appropriation or in those of the civilian agencies ordinarily charged with fire control. As to final results, an item of $2,760,000 for emergency fire protection in "dim-out" areas along the Atlantic and Pacific coasts was stricken out of the Military Appropriation bill (H. R. 2996), but the allotments to the Forest Service were increased. They are as follows: Clarke-McNary funds, $6,300,000, of which $2,300,000 is for critical areas without matching by state funds; emergency fire control on national forests, $2,151,711; fire fighting on national forests, $100,000—a total of $8,551,711. The $100,000 item is a standing appropriation for actual fire fighting. Sums exceeding this are later paid for by deficiency appropriations. The Forest Service is $3,377,779 short of what it requested for adequate regular and emergency protection, but $700,000 was finally allotted for emergency fire protection on federal lands under jurisdiction of the Interior Department (H. R. 2719).

An item of $1,000,000 was finally included in the National War Agencies Appropriation (H. R. 2968) for cooperative work between the Lumber Division of the War Production Board and the Forest Service to increase lumber production.

Restrictions and Eliminations

Eliminated by the Agricultural Appropriation Conference Committee was a $415,000 item for care of plantations on the national forests which the Senate had concurred with the Forest Service as being a desirable expenditure to protect a large government investment. The committee also eliminated a $30,000 item for purchase of land to expand the wartime work of the Forest Products Laboratory at Madison, Wisconsin. It also retained the language of the House bill which, by restricting use of federal funds for cutting of diseased trees, will

(*Turn to page* 410)

FEDERAL CONSERVATION FUNDS

Agency and Appropriation	1944 Appropriated	1944 Budget Bureau Recommendation	1943 Appropriated[1]
Agricultural Dept. (Total)	$52,669,899	$54,076,974	$58,279,143
Forest Service (Total)	24,678,065	25,028,627	25,730,759
General Administration	563,670	563,670	569,144
National Forests	12,826,826	13,241,826	12,710,691
Fighting forest fire	100,000	100,000	100,000
Emergency fire control	2,151,711	3,675,788	5,000,000
Forest plantation care	.....	415,000	.....
Land acquisition	100,000	100,000	294,862
Water rights	9,410	9,410	10,000
Forest fire cooperation	6,300,000	3,989,723	3,992,210
Farm and other private forestry cooperation	746,168	808,110	810,442
Forest research (Total)	1,880,280	2,125,100	2,243,410
Forest management	400,000	514,900	543,829
Range investigations	250,000	241,970	255,500
Forest products	940,280	940,280	991,789
Forest survey	140,000	189,400	200,292
Forest economics	75,000	112,580	119,000
Forest influences	75,000	125,970	133,000
Soil Conservation Service (Total)	22,325,136	22,042,992	22,276,516
Forestry in other Bureaus (Total)	5,662,698	7,005,355	10,271,868
Forest roads and trails	2,537,168	3,778,723	6,965,335
Forest pathology	239,100	244,100	258,460
National arboretum	38,000	38,000	45,892
Gypsy and brown tail moth	350,000	363,060	382,570
Dutch elm disease	333,330	333,330	352,475
Forest insects	150,000	189,700	199,680
Naval stores investigations	115,100	112,100	118,456
White pine blister rust[2]	1,900,000	1,946,342	1,949,000
Interior Dept. (Total)	13,379,150	13,870,815	14,060,070
Fish and Wildlife Service	5,456,390	5,752,365	5,911,660
National Park Service	4,053,310	4,793,000	4,846,020
Grazing Service	950,700	970,700	859,800
Soil conservation on public domain	1,198,200	1,298,200	1,340,000
Range improvement on public domain	36,550	36,550	37,550
O and C lands	285,000	290,000	248,750
Emergency fire prevention	700,000	.....	95,900
Indian forests (Total)	589,500	610,000	547,580
Administration	412,500	425,000	381,910
Timber sales	140.000	145.000	125,670
Forest fires	37,000	40,000	40,000
Alaska[3]	109,500	120,000	118,810
Forest fire prevention	29,500	30,000	27,650
Reindeer protection	80,000	90,000	91,160
Miscellaneous conservation items:			
Civilian Conservation Corps[4]	20,000	.....	8,000,000
War Production Board, Lumber Production Study	1,000,000	179,480	.....
Access roads[5]	75,000,000	75,000,000	74,600,000

[1]Does not include deficiency appropriations.
[2]Part goes to Forest Service.
[3]Other Alaska items not segregated.
[4]To complete liquidation operations.
[5]Not all for forest roads.

CONSERVATION CALENDAR

Important Bills in Congress with Action
June 11 - July 8, 1943

Bills Enacted

S. Res. 134.—O'Mahoney—Authorizing the Committee on Public Lands and Surveys, or any duly authorized subcommittee thereof, to make a full and complete study and investigation of the administration of Jackson Hole and other national monuments and parks. Agreed to July 8, 1943.

H. R. 2481—Tarver—Making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1944. Passed House April 19, 1943. Passed Senate with amendments June 11, 1943. Approved by the President July 12, 1943. Public Law No. 129.

H. R. 2714—Cannon, Missouri—Making appropriations to supply urgent deficiencies in certain appropriations for the fiscal year ending June 30, 1943, and for prior years. Passed House May 18, 1943. Passed Senate with amendments May 28, 1943. Approved by the President July 12, 1943. Public Law No. 132.

H. R. 2719 — Johnson, Oklahoma — Making appropriations for the Department of the Interior for the fiscal year ending June 30, 1944. Passed House May 20, 1943. Passed Senate with amendments June 18, 1943. Approved by the President July 12, 1943. Public Law No. 133.

Conservation

S. 1330 — Wallgren — To further the conservation and proper use of the forest resources of the nation and to effectuate the recommendation of the Joint Congressional Committee on Forestry submitted to the Congress pursuant to Senate Concurrent Resolution 31 (52 Stat. 1452), as amended, and for other purposes. Introduced July 8, 1943. Referred to the Committee on Agriculture and Forestry.

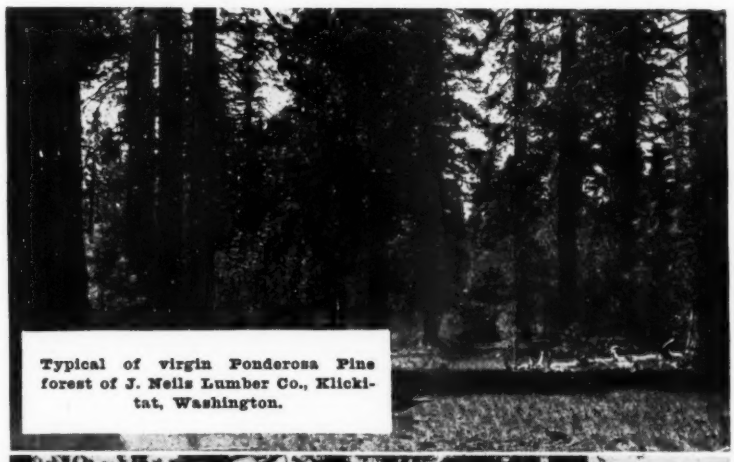
Forestry

S. 45—McNary—To further amend Section 3 of Public Law No. 270, approved June 7, 1924 (Clarke-McNary), providing for forest perpetuation and extension, by increasing the annual authorization therefor and extending aid in combating tree insects and diseases. Passed Senate July 3, 1943. Referred to the House Committee on Agriculture July 5, 1943.

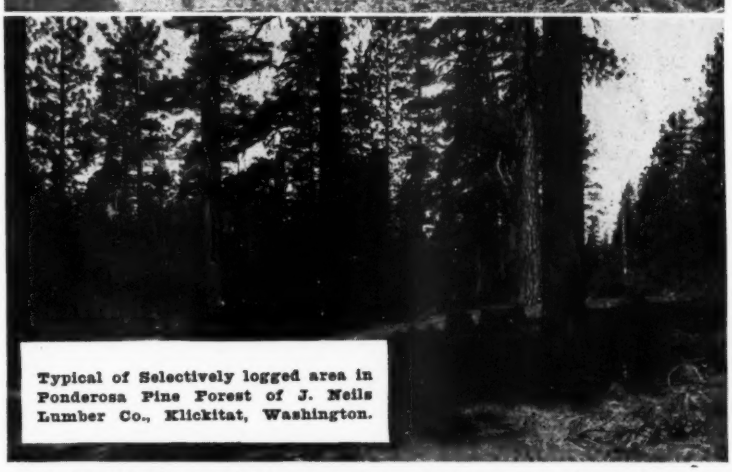
S. 250 — McNary — To promote sustained-yield forest management. Passed Senate July 8, 1943.

CARE IN CUTTING TIMBER AT KLICKITAT, WASHINGTON

Saves Forest For Future Generations



Typical of virgin Ponderosa Pine forest of J. Neils Lumber Co., Klickitat, Washington.



Typical of Selectively logged area in Ponderosa Pine Forest of J. Neils Lumber Co., Klickitat, Washington.

Only ripe timber is removed, releasing young trees for faster growth. Growth of the young trees under this scientific system will replace within thirty-five years the timber removed by present cutting, assuring a perpetual supply.

J. NEILS LUMBER COMPANY

LE ROY JOHNSON, 295 Madison Avenue, New York, N. Y.
J. C. ROCHE, 647 Midland Bank Bldg., Minneapolis, Minn.
PAUL CURTIS, 308 W. Washington, Chicago, Illinois

MILLS AT KLICKITAT, WASH., AND LIBBY, MONT.

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SANDVIK BOW SAWS lead in quality and performance, are always dependable and materially assist in reducing operating costs. FRAMES of lightweight Steel Tubing, SAWS made from best procurable saw Steel, thin back, fast and easy cutting.

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Sandvik Saw & Tool Corporation
47 WARREN ST. NEW YORK, N. Y.

BETTER LAWNS FOR HOMES AND PARKS, by Howard B. Sprague. Published by Whittlesey House, McGraw-Hill Book Company, New York. 205 pages, illustrated. Price, $2.00.

Here are the essential facts which a home owner, estate manager, greenskeeper, or park superintendent needs for planting and maintaining lawns easily and efficiently. Specific directions for soil preparation and planting, the characteristics of grasses, regular management practices, and control of common weeds and insect pests are presented in simple, easy-to-follow form. Of particular interest are the sketches showing how to identify the various grasses by leaf and stem characters.

MODERN CAMPING GUIDE, by George W. Martin. Published by D. Appleton-Century Company, New York. 349 pages, illustrated. Price $2.50.

To those who love to follow the wooded trails to camping sites, this book is especially dedicated. Every phase of camping is dealt with whether one goes by automobile, canoe, or afoot. Every detail of equipment—shelter, apparel, sleeping facilities, cooking utensils and provisions—is discussed, together with instructions concerning insect remedies and preventives, as well as safety and first-aid advice.

The book is complete with bibliography and index.

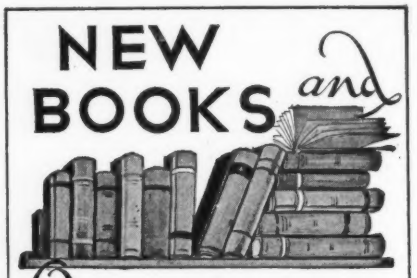
AMERICAN TREES, by Russell T. Limbach. 39 pages, illustrated in color and black and white leaf drawings by the author. Published by Random House, New York. Price $1.00.

A book on trees, beautifully and authentically illustrated, which treats—with brief but informative text—some of the more important and familiar trees in the American landscape.

MEET THE NATIVES (An Easy Way to Recognize Rocky Mountain Wildflowers, Trees and Shrubs), by M. Walter Pesman. Available from the author, 372 South Humboldt, Denver, Colorado. 216 pages, illustrated. Price $1.25.

Written in popular terminology, this pocket size, ring bound handbook is an outstanding contribution to the field of botanical information, being directed specifically toward the guidance of the layman in identifying the native plants of the Central Rocky Mountain region.

The book is divided into five sections, grouping plants by zone occurrence: alpine, subalpine, montane, foothills, and plains. Seven hundred species of trees, shrubs, and wild flowers are listed and described for easy identification.



A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request.

GUN DOGS AFIELD, by Horace Lytle. Published by G. P. Putnam's Sons, New York. Illustrated by Lynn Bogue Hunt. 277 pages. Price, $5.00.

Memorable experiences of a famous gun dog editor, hunter and field trial judge with bird dogs, dramatically and vividly presented. Author Lytle takes the reader with him through twenty fascinating chapters from Florida, the Mississippi bottomland, and the Georgia pines to the fields of Ohio, Illinois and other places that hunting men and their dogs know best. Here is grand reading for the dog lover and sportsman.

HIGH CONQUEST, The Story of Mountaineering, by James Ramsey Ullman. Published by J. B. Lippincott, Philadelphia, Pennsylvania. 344 pages, illustrated. Price, $3.75.

High Conquest, as its name suggests, is a story of man's struggle to conquer the high places of the earth. It opens to the reader a broad outline of the relationship between mountains and man and gives him the stories of some of man's great mountain climbs during the past two decades. The opening chapter starts with days when man viewed the mountains with fear as the abode of spirits and demons. Subsequent chapters carry the reader swiftly forward through the pioneering days of mountaineering to the high conquests of recent years. Here one finds absorbing stories of great climbs in the Alps, Andes, Africa, Alaska and our own Rockies. Included also are chapters discussing the art of mountain climbing and the high mountains of North America. Written during the second year of World War II, High Conquest is "escape reading" of the worthwhile sort for all who love the mountains and the outdoors.

THE SONG OF JED SMITH, by John G. Neihardt. The Macmillan Company, New York. 113 pages. Price $1.90.

Jedediah Smith, whose character and adventures are exploited by this epic song, was one of the greatest of our continental explorers after Lewis and Clark. He led the first band of Americans overland to Spanish California and was the first to cross the great central desert from the Sierras to Salt Lake. He explored, during seven years of wandering, the vast country lying between the Columbia and Colorado Rivers from Salt Lake to the Sierras. Smith was killed by Comanches at the age of thirty-two, while piloting a wagon train to Santa Fe, and Mr. Neihardt has chosen the high lights of his character and career for this book, completing his "Cycle of the West" — five heroic narrative poems, beginning with the epic period of the American West in the year 1822.

THE BADIANUS MANUSCRIPT—AN AZTEC HERBAL OF 1552. Introduction, Translation and Annotations by Emily W. Emmart. The Johns Hopkins Press, 1940. Illustrations in color. 314 pages. Price $7.50.

The Spanish invasion of Mexico brought into contact two civilizations, neither of which had previously known the other existed. It is often thought that the complete military victory of the Spaniards and their subsequent conduct brought about the destruction of all evidence of Aztec culture, except stone monuments too massive to be conveniently liquidated. Fortunately the Conquistadores were not quite so ruthless. A minority of them were keenly interested in the new country, its people and its resources. Authorities in Spain were diligent in demanding reports on plants, animals and mineral resources of the colonies and in sending out missions to study them. The Church founded schools to educate Aztec students, some of whom prepared reports on the native arts and crafts.

All such reports were duly sent back to the home country, many of them only to be buried unread in government and church archives. A few were published in reduced form and limited editions, edited by men who knew little about the subject. For many years this material has been gradually unearthed by scholars and put in usable form for the modern student. In the opinion of experts much remains to be discovered.

The Badianus Manuscript is one of these finds. It is an account of Aztec

medicinal plants and Aztec medicine written in the native tongue by one Aztec physician and translated into Latin by another Aztec. Both men worked under the auspices of a Spanish school established for the Indians. This manuscript came to light in the Vatican Library at Rome in 1929. Just how it got there seems to be a mystery. Thanks to the labors of Emily Walcott Emmart, assisted by many others, this treasure-house of botanical and medical lore has been made available to present day scholars.

The original color plates and accompanying manuscript text have been reproduced on paper which is also, outwardly at least, a facsimile of the original. The Latin text and English texts are printed in parallel columns and are copiously annotated for the benefit of the botanical and the medically minded. The illustrations are somewhat stylized particularly as to root but the author's use of different colors to indicate the kind of soil in which plants grew is of interest. Reproduction of this old manuscript is a work of art.

The medical lore of the Aztecs seems to have been not far behind that of their European contemporaries. Its rediscovery adds further evidence to that already accumulated that those of our Mexican neighbors who are of Indian origin have every reason to be proud of their heritage.

FRESH WATER FISHING, by Myron E. Shoemaker. Published by Doubleday, Doran & Company, Inc., New York. 218 pages, illustrated. Price, $3.00.

A fisherman's manual—a complete guide for the fresh water angler, treating the places to fish, the history of angling, the principles of fly casting and the equipment required, the flies and lures used in various kinds of fishing, the principles of bait casting and the kinds of bait used. In addition, the author devotes a chapter to each of the important fresh water fish to be found in North American streams and lakes. Four color plates are used to show eighteen fish in natural color. A book any fisherman will delight in.

GUIDE TO PATHS IN THE BLUE RIDGE. Published by the Potomac Appalachian Trail Club, Inc., Washington, D. C. 3rd edition—15 maps. Price $3.50.

Describing fully the 617 miles of the Appalachian Trail along South Mountain in Pennsylvania and Maryland, and the Blue Ridge of Virginia, together with side trail trips, this Guide is a compendium of answers to the many questions of recreationists in the nearby mountains and the Shenandoah National Park. It is almost indispensable to one who plans a trip in the area. The Guide is in loose leaf form and novel in that the sections are definitely divided and only the sheets and maps for the section to be visited need be taken on a trip. Yet the binder, of simulated leather and stamped in gold, holds the book—conveniently sized 6½ by 4½—firmly in place. Another nice feature is the strong, transparent map case, included in the price of the book, in which both sheets and maps may be carried to preserve them when out of the binder.

The publications listed below must be ordered direct from the addresses as given and not through the Association.

Stock Poisoning Plants of California, by Arthur W. Sampson and Henry E. Malmsten. Bull. 593, College of Agriculture, University of California, Berkeley, Calif.

The Paper and Pulp Industries of New York State. Pub. No. 2, New York State Division of Commerce, Albany, N. Y.

Common Insects of the Flower Garden, by Grace H. Griswold. Cornell Extension Bull. 371. N. Y. State Coll. of Agr., Cornell Univ., Ithaca, N. Y.

Forest Resources of the Delta Section of Mississippi, by W. S. Stover. For. Survey Rel. No. 53, Sou. For. Expt. Sta., New Orleans, La.

The Distribution of Commercial Forest Trees in Virginia, by T. C. Evans—For. Survey Rel. No. 10—

Virginia's Forests, by Thomas Lotti and Thomas C. Evans, For. Survey Rel. No. 11 and

Outside-Bark Form Class Volume Tables for Some Southern Appalachian Species, by Jesse H. Buel, Tech. Note No. 53. For. Serv., U.S.D.A., Sou. For. Expt. Sta., Asheville, N. C.

The Wild Turkey in Virginia—Its Habit and Management. Published by the Educational Division, Virginia Commission of Game and Inland Fisheries, Travelers Building, Richmond, Virginia.

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8-43

Conservation in Congress

(*From page* 406)

cripple the effectiveness of the Dutch elm disease work.

To insure that federal funds are not used for the National Resources Planning Board (see page 356, July issue), a rider was written into the Independent Offices Appropriation bill (H. R. 1762), directing that the President make no expenditures for activities not authorized in the bill.

The National Youth Administration was legislated out of existence and the Civilian Conservation Corps was granted $20,000 to wind up its affairs.

The rider in the Interior Department Appropriation bill (H. R. 2719) preventing expenditures for administration of the highly controversial Jackson Hole National Monument (see page 360, July issue) remained in the final bill. Further hearings on H. R. 2241, a bill to formally abolish the monument, are to be held in Wyoming this summer.

Part of the appropriation of $75,000,000 (H. R. 2798) for building roads to get out strategic war materials will be spent to reach isolated bodies of timber on or adjacent to national forests. Plans call for construction or completion of some 555 miles of such roads in Montana, Colorado, Arizona, New Mexico, Idaho, California, Washington, Oregon, Alabama, and Minnesota.

Other Legislation

Congress recessed without acting on a number of important conservation bills, but since this is not an adjournment, they may be considered after the recess.

The Sustained-Yield Bill—On July 8 the Senate passed Senator McNary's S. 250, known as the sustained-yield bill. Its objective is to enable the Secretaries of Agriculture and Interior to cooperate jointly or separately with private land owners in establishing sustained-yield production in forests where public and private holdings interlock, and the individual holdings are too small to permit continuous cutting operations. If it becomes law, it will be a step in rationalizing forest operations in Oregon and Washington where "checkerboard" holdings are a curse.

Amendment to Clarke-McNary Law—On July 3 the Senate passed Senator McNary's bill S. 45, amending the Clarke-McNary Act of June 7, 1924, to increase authorized expenditures for cooperative fire protection with the states from $2,500,000 to $9,000,000. It will probably be brought before the House after the recess. If the bill becomes law, it will make possible regular annual appropriations for cooperative fire protection commensurate with nationwide needs. To meet wartime emergency fire hazards, it has been necessary to pass emergency appropriations against opposition based on the legal objections to exceeding the sum authorized by the law, as has happened during the past two years. (See also Editor's Log, page 373.)

Surplus Game — Another public land bill recently introduced is S. 1152, by Senator McCarran. It is entitled "A bill to provide for the conservation of wildlife on the public lands and reservations of the United States," and is designed to give greater power to the federal government in the handling of surplus game on public lands. The bill is apparently the outgrowth of a series of hearings on many public land matters by the Senate Committee on Public Lands made under Senate Resolution 241 of the 76th Congress. Further hearings will be held in the west this summer.

Uncle Sam—Taxpayer—The federal government is the largest land owner in the country. It cannot be taxed by states or local taxing units without consent of Congress—which is seldom given. However, Congress at various times has made provisions for payment in lieu of state or local taxes. These payments have not been made on a uniform basis as between different categories of federal lands and for some categories have not been made at all. Each session sees bills introduced to change the various methods, and recent huge federal purchases of land for defense purposes has increased the number.

In view of this flood, President Roosevelt, in Executive Order 8034, dated January, 1939, established the Federal Real Estate Board, composed of representatives of the federal agencies administering federal lands, to study and recommend changes in lieu payments. The report, as House Document No. 216, 78th Congress, has been referred to the House Committee on Public Lands. Among changes recommended are those in basis of calculation of payments to states in which national forests are located and to establish payments on certain national park lands. On July 7, House Resolution 281 was passed authorizing the House Public Lands Committee to study and report on lieu payments and other public land matters. It is expected that some of its hearings will be in the West and will include Jackson Hole.

In Embattled Sicily

Canadian troops, as this issue goes to press, have captured Caltagirone in Sicily. In advancing on it from the south they undoubtedly fought their way through part of the cork forest shown above. Its open character probably permitted the use of tanks and other mechanized equipment. The cork oak forests of Sicily are not extensive, the one near Caltagirone being the largest on the Island.

In the mountains of northern Sicily other species of evergreen oaks make up the bulk of the forests. Their chief value is for fuelwood. Much of northern Sicily is rough—perhaps too rough for mechanized warfare.—P. L. Buttrick.

The National Parks in Wartime

(*From page* 378)

isolated present separated from the past and future. The nation which forgets its past will have no future worth remembering.

The wisdom of the nation in preserving areas of the type represented by national parks and monuments is clearly evident on the American continent today as increased demands upon our natural resources are invading and forever changing the native landscape. As long as the basic law that created them endures, we are assured of at least these few places in the world where forests continue to evolve normally, where animal life remains in harmonious relationship to its environment, and where the ways of nature and its works may still be studied in the original design.

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Rubber of the Future

(*From page* 386)

Thomas A. Fennell, president of that corporation, has pointed out that his organization in no way desires to alter the present pattern of land ownership in Haiti, which is essentially a country of small peasant-owned farms. There, women work on the farms just as do men. Whole families clear and till the land, harvest the crops, and transport them to the market. That system is the foundation of the whole Haitian way of living, and any program that would tend to alter it would be doing Haiti a disservice. Small holders are demonstrating that not only can they cultivate rubber but that they can produce it in competition with large holders.

The good wages which rubber production brings the small family unit, providing a cash income to supplement other income, helps to develop contented rural populations. And contented rural populations will undoubtedly mean much more to the future of this hemisphere than some synthetic rubber factories operated under high-tariff protection.

Actual prices for synthetic rubber, taking into consideration the contemplated large-scale production and the benefits to be expected from research during the next few years, will be around thirty cents a pound for synthetic rubber from petroleum and about forty cents for the same product from grain.

Vice President Wallace, in an article in the New York Times magazine last year, said: "Looking ahead to the new time of peace, the motorists of the United States will not only want to have an assured source of rubber, but they will want to get that rubber as cheaply as possible. In the matter of cost, natural rubber from either the Far East or the Western Hemisphere is likely to have a big advantage over synthetic. And, even if synthetic rubber is available in large quantities at a low price, a substantial amount of natural rubber will still be needed for mixing with the synthetic product.

"Few automobile users in the United States realize that the technology of producing rubber from trees is changing almost as rapidly as the technology of producing synthetic rubber. During the last ten years, higher-yielding strains of rubber have been developed. Some of these strains yield two, three, four, and even five times as much as the old-fashioned strains customarily used in the Far East. With modern strains of the Hevea rubber plants, there is every reason to believe that during the period after the war rubber can be profitably laid down in New York city from either South America or the East Indies at less than ten cents a pound. Therefore, to protect synthetic rubber produced in the United States from destructive competition would require a tariff of at least ten cents a pound and probably twenty cents."

Natural rubber, under modern conditions, should not cost more than ten cents a pound to produce and probably will be produced for less. Hevea is preeminently the most important species for commercial rubber production, but there are other kinds which offer great possibilities, not only from the standpoint of low cost of production under proper conditions but specific qualities. In certain areas in Mexico and Central America conditions are more favorable to the growing of Castilla than Hevea rubber. In those areas, however, as in the West Indies, the Cryptostegia plant, a source of high-quality rubber, appears to offer emergency possibilities.

Cryptostegia rubber under present conditions might cost as much as seventy-five cents a pound. Indications are that with continued research and experience in growing it, it may be possible to bring its cost down to that of Hevea rubber. Under ordinary growing conditions it will produce only 400 to 500 pounds of rubber an acre. Under the most favorable conditions of fertile soil and high rainfall, it is a potential source of more rubber an acre than any other rubber plant known. It is believed possible with proper horticultural prac-

Special Douglas Fir Issue
May, 1943

This issue of AMERICAN FORESTS was devoted to a forested corner of the United States commonly known as the Douglas fir region of the Pacific Northwest. In point of area the region is not great when compared to the broad expanse of land lying between our two oceans. But in point of forests and what is going on in them, it is a vital scene in the current drama of American forestry.

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tices to stimulate its fast-growing young water shoots of branches to yield over a ton of rubber to the acre.

At present there are many unknown quantities in the production of Cryptostegia rubber. Good techniques for it can not be developed until large scale plantings which are just being made are in production. As yet not even the important operation of tapping has been completely worked out for Cryptostegia. In areas where labor is plentiful it may be found practicable to cut the young shoots of the Cryptostegia vine so as to have the latex drain into cups as in tapping operations with Hevea or Castilla rubber. It appears more probable, however, that the mature vines will be cut and gathered by some mechanical means and the latex extracted chemically.

Just what the chief source of our rubber will be ten years from now no one can say with certainty. All signs, however, point to natural rubber as the product on which we shall rely mainly in the tremendously expanded industry of the future. Natural rubber has served our needs well in the past and there is every indication that it will continue to do so in an increasingly satisfactory way as time goes on.

War and the Farm Fish Pond

(*From page* 393)

forty percent lower on natural food without hand feeding. Estimates have been made for fish derived from fertilized ponds in this country and the concensus of these falls within the limits quoted above.

Ohio has under construction approximately 400 ponds which will be stocked during 1943 and should start to produce in 1944. Whereas the Fish and Wildlife Service did not allot any fish to the Soil Conservation Service for stocking farm ponds up to July 1, 1940, during the last calendar year, the Fish and Wildlife Service stocked 2,360 ponds and anticipate stocking 4,000 this year in the Southeast region alone. In Texas, at a conference on farm pond management, which met on July 2, 1942, it was estimated that there were between 75,000 and 100,000 tanks and ponds in the state which may be stocked, beginning this year. Such institutions as Virginia Polytechnic Institute and Texas State College have research staffs working on the management of farm ponds.

The importance of the program can readily be realized when it is noted that the amount of fish produced up to July, 1940, from farm ponds stocked by the Fish and Wildlife Service was negligible. In 1941 it had advanced to an estimated 431,000 pounds and in 1942 to 985,000 pounds. The estimate of the potential output based on fish to be stocked in 1943 is 5,806,000 pounds for ponds which we anticipate will be stocked. This does not include those stocked by state conservation departments.

All activities of the Fish and Wildlife Service in connection with the farm fish pond program have been closely tied to collaborating agencies. In the Southeast the Soil Conservation Service has been largely responsible for the building of ponds. In other sections many are private enterprises, but by and large, it has required the full cooperation of Fish and Wildlife Service hatcheries with those of the various states to carry the program through. Its success is assured in the South where the long growing season makes possible a much larger production of fish. Production an acre will decrease progressively farther and farther north. In any case it is anticipated that the program may go beyond the bounds of the farm pond and become more nearly comparable to commercial fish farming as practiced in other countries.

Although only one farmer in ten may have a suitable body of water for this use, and even though he produced less than one hundred pounds of fish a year, there would still be a considerable amount of food produced to replace shipments from the seaboard and the Great Lakes Region. Even though not a pound of this fish may reach the market, the pond will have served its purpose in contributing to the variety of diet, and to recreational values. That old gully on the south forty may be dammed in spare time at little cost to prevent the south pasture from washing away, and fertilizers available on the farm will produce a crop of fish. As with many other things, we are rediscovering what the Chinese knew in 2,000 B. C.

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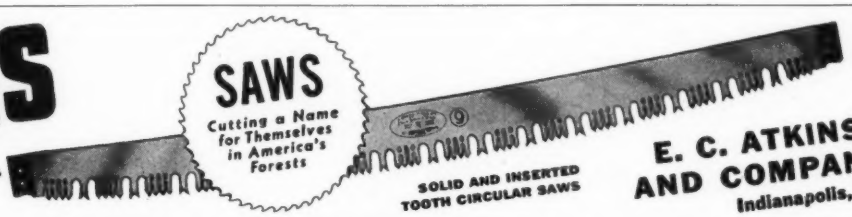

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8-43

Early Wildlife Americana

(*From page* 389)

One of God's gifts to natural history at the time was the French naturalist, Comte de Buffon. Among other accomplishments, he is credited with the coinage of the name "cougar," often applied to the puma, and now used most commonly in northwestern United States.

A controversy developed between Jefferson and Buffon over the size of several of the larger American mammals, when compared to those of the old countries, particularly with reference to the deer family, and more especially the moose. The prevailing European thought at the time was that members of the American deer family were mere runts when compared to those of Europe, all of which fitted to a nicety the concept of Buffon and contemporary European naturalists. The American moose during this period was little known abroad. Even its existence was denied by some, and by others it was confused with the reindeer, other native deer, and the red deer of Europe.

To back up his statements as to the size of members of our deer family, Jefferson, between 1784 and 1787, after three years of effort and ordeal, and heavy personal expense, had a large cow moose carcass shipped in toto to Paris from Vermont, where the specimen had been taken.

The scene at the time Jefferson laid the moose carcass before Buffon, who apparently had no previous knowledge of what Jefferson was doing, must have been imposing. Buffon, after viewing the moose, is reported to have said: "I should have consulted you, Monsieur, before publishing my book on natural history, and then I should have been sure of my facts."

This Jefferson-Buffon episode was one of the earliest international controversies involving natural history. Others followed, important among them the argument over the existence of the American black-footed ferret, fomented mainly by British naturalists until blasted by Elliott Coues, the American naturalist, late in the nineteenth century.

To further acquaint the leading European naturalists with America's fauna, other mammal specimens were taken to Europe from time to time by Jefferson, among which was the skin of a large puma, which he purchased with his own funds. Thus the patron saint of the Declaration of Independence, generally thought of in the role of statesman, also went down in history as one of America's leading mammalogists.

A Prophet Profits

(*From page* 381)

choppers who occupy them farm a few acres on the side.

Many wood cutters are middle aged bachelors who prefer to live alone, cook their own meals, and otherwise "do for themselves." They go to bed with the dark, get up with the sun, love peace and solitude; detest interference, restrictions, and any meddling in their affairs. For them the company provides small solitary cabins scattered deep in the woods.

Wood cutters are proud of their prowess and skill. Most are satisfied if they cut and stack a cord of wood a day. We were introduced to a wiry, pink cheeked, little man in his sixties—Fred Rink. In 1918, when Fred was thirty-five and weighed 160, he devoted a month to settling an argument as to just how many cords a man handy with the ax and willing to work, *could* make. He cut, split, and piled an average of three and a half cords a day for thirty consecutive days, a total of 105 cords. To keep himself limber, he cooked his own meals and, during moonlight nights, cradled five acres of buckwheat. He has been acknowledged the county's champion wood cutter ever since. He is the modest father of nine children — the youngest, twin boys aged twelve.

Most of these men remember when their county seemed destined to economic death from overcutting and erosion. Now it is the heaviest timbered section of north-central Pennsylvania, growing more wood each succeeding year than is harvested. The new forests provide a local payroll which currently tops $2,000 a day. Many of the employees own stock in the company, bought from their earnings in woods and mills.

Roulette is wholly dependent on the Gray Chemical Company, supported by the forest. It has survived fire and flood. The high waters of July 1918 washed away much of the town, buried many buildings. Many small communities would have thrown up the sponge, but Roulette came back. Again, a few years ago, fire and flood destroyed most of the chemical plant. It was immediately rebuilt.

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We also want to warn you that—if you don't bother to read it carefully enough to understand it—you may wake up after this war as poor as a church mouse.

• • •

This year Americans are going to make—minus taxes—125 billion dollars.

But this year, we civilians are not going to have 125 billion dollars' worth of goods to spend this on. We're only going to have 80 billion dollars' worth. The rest of our goods are being used to fight the war.

That leaves 45 billion dollars' worth of money burning in our jeans.

Well, we can do 2 things with this 45 billion dollars. One will make us all poor after the war. The other way will make us decently prosperous.

This way the 45 billion dollars will make us poor

If each of us should take his share of this 45 billion dollars (which averages approximately $330 per person) and hustle out to buy all he could with it—what would happen is what happens at an auction where every farmer there wants a horse that's up for sale.

If we tried to buy all we wanted, we would bid the prices of things up and up and up. Instead of paying $10 for a dress we're going to pay $15. Instead of $5 for a pair of shoes we're going to pay $8.

This bidding for scarce goods is going to raise prices faster than wages. Wages just won't keep up.

So what will people do?

U. S. workers will ask for more money. Since labor is scarce, a lot of them will get it. Then farmers and business men who

feel the pinch are going to ask more money for their goods.

And prices will go *still higher*. And the majority of us will be in that same old spot again—only worse.

This is what is known as Inflation.

Our government is doing a lot of things to keep prices down . . . rationing the scarcest goods, putting ceiling prices on things, stabilizing wages, increasing taxes.

But the government can't do the *whole job*. So let's see what *we* can do about it.

This way the 45 billion dollars will make us prosperous

If, instead of running out with our extra dough, and trying to bid on everything in sight, we buy only what we absolutely need, we will come out all right.

If, for instance, we put this money into (1) Taxes; (2) War Bonds; (3) Paying off old debts; (4) Life Insurance; and (5) The Bank, we don't bid up the prices of goods at all. And if besides doing this we (6) refuse to pay more than the ceiling prices; and (7) ask no more for what we have to sell—no more in wages, no more for goods—*prices stay where they are now.*

And we pile up a bank account. We have our family protected in case we die. We have War Bonds that'll make the down payment on a new house after the war, or help us retire some day. And we don't have taxes after the war that practically strangle us.

Maybe, doing this sounds as if it isn't fun. But being shot at up at the front isn't fun, either. You have a duty to those soldiers as well as to yourself. You *can't* let the money that's burning a hole in your pocket start setting the country on fire.

★ ★ ★

This advertisement, prepared by the War Advertising Council, is contributed by this Magazine in co-operation with the Magazine Publishers of America.

KEEP PRICES DOWN!

Use it up
Wear it out
Make it do
Or do without

A NEW POSTER STAMP FOR YOUR WARTIME FIGHT AGAINST FOREST FIRES

Each Stamp in 4-Colors.
Actual Size

These stamps will help spread the message of forest fire prevention. Each stamp beautifully printed in 4-colors. Available in sheets of 100 at $1 a sheet. They are ideal for use on letterheads and envelopes, and each sheet used will mean that 100 individuals have been appealed to directly in the immediate fight to "stop forest fires before they start."

SEND YOUR ORDER TODAY.
STAMP OUT FOREST FIRES WITH POSTER STAMPS.

Order Blank

Please send me ..... sheets ($1 per sheet) of the new Forest Fire Prevention Poster Stamps (100 to a sheet). I enclose $.....

Name.....

Street Address.....

City..... State.....

Fill in, tear out and return to

THE AMERICAN FORESTRY ASSOCIATION

919 SEVENTEENTH ST., N. W.
WASHINGTON 6, D. C.

Permitted to regrow naturally into a hardwood thicket unfended by the ax, this section might have made a meager living as a recreational area. But fortunately hunting and fishing do not suffer under good forest management. Together they help pay grocery bills and keep schools and churches running. The stores and banks, doctors and garages, little machine shops and a host of other small enterprises prosper on the money circulating from the company's payrolls, and each year get an added lift from the increasing numbers of sportsmen who seek recreation in the Potter County hills. Railroads carrying freight no longer threaten to tear up their tracks, and county, city, and village employees find a pleasant as well as profitable source of livelihood in this game-filled region of growing forest.

By his quiet, exemplary leadership, Bob Lyman has shown what private forestry can do. And do not think that the people of Potter County do not appreciate it! One of the loggers told us that Bob never locks his summer camp with its store of fishing tackle, guns, tools, food and blankets. None in the region will turn an underhand trick against Bob Lyman, nor permit a wanderer from "outside" to "do him mean." That is the way the folks in the restored forest-green heart of the old Pennsylvania Desert" regard Bob Lyman—their homegrown prophet. He has demonstrated that forestry can be made to pay, not only in cash dividends but in what is equally important in human welfare.

CREDIT FOR PHOTOGRAPHS

Credit for photographs appearing in this issue is acknowledged as follows:

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National Park Service, U. S. Department of the Interior—pages 374, 375 and 377.

Padilla Studio, Los Angeles—page 376.

Pennsylvania Department of Forests and Waters—pages 379, 380 (upper) and 381.

Soil Conservation Service — page 392.

U. S. Fish and Wildlife Service—page 387.

U. S. Forest Service — pages 390 and 391.

Walker, Ernest P., National Zoological Park—pages 388 and 389.

WHO'S WHO
Among the Authors in this Issue

Newton B. Drury

NEWTON B. DRURY (*The National Parks in Wartime*), distinguished conservationist, is Director of the National Park Service, with headquarters now in Chicago. Mr. Drury is a native Californian and has always been a leader in the direction of park and recreation work in the State. For twenty years he was Secretary of the Save-the-Redwoods League.

NELSON C. BROWN (*A Prophet Profits His Own Country*), forester and author, writes from Syracuse, where he is a member of the faculty of the New York State College of Agriculture, in charge of the Department of Forest Utilization.

ESTHER LEE CARTER (*Indian Moon Legend*) lives at Tacoma, Washington, and has been writing and publishing poetry and prose for a long time.

DR. EARL N. BRESSMAN (*Rubber of the Future*) is Director of the Division of Agriculture in the Office of the Coordinator of Inter-American Affairs, the work of which is directed to meet the greatly increased need for the development of agricultural cooperation in the Western Hemisphere.

STANLEY P. YOUNG (*Early Wildlife Americana*), Senior Biologist of the Fish and Wildlife Service, is a well-known wildlifer and formerly director of all predatory animal control work with the Biological Survey.

P. L. BUTTRICK (*Public Regulation of Private Forests*), forester, appears in these columns after a long hiatus. Born in New Haven, Connecticut, he took his master's degree in forestry from Yale in 1911, since which time he has been busy at his profession here and abroad. His book, "Forest Economics and Finance," came out this March.

WINSLOW GOOCH (*Winter Sleet Storms*), is in charge of the forest activities of the Chesapeake Corporation at West Point, Virginia.

O. LLOYD MEEHEAN (*The War and the Farm Fish Pond*) has been with the Fish and Wildlife Service since 1930. He is now Assistant Chief of the Division of Fish Culture.

THE COVER—*Deer at Twilight.* Photograph by Hobart V. Roberts.

MOST POWERFUL PORTABLE PUMPER for Weight and Size EVER BUILT!

☆ **Free!** JUST OFF THE PRESS— The third edition of our original, "FIGHT FIRE WITH WATER", has been completely revised. It is now more than a booklet— it is "A Manual". Write today for your free copy.

Type "Y" Pacific Pumper

FIRE FIGHTING EQUIPMENT DIVISION

PACIFIC MARINE SUPPLY COMPANY

SEATTLE, WASHINGTON

INDIAN

Fire Pumps

The lumber he saves from **FIRE**

WILL BUILD THE WAR MATERIAL OUR COUNTRY NEEDS!

SABOTAGE

"Sabotage is the wrongful damaging or destruction of any material or supply deemed suitable for the use of the United States or its allies in carrying on the war.

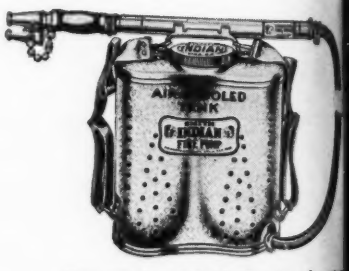
"Lumber (including standing timber) is considered one of these suitable materials, and accordingly must be preserved against any action that might lead to its loss to the United States or the allied nations."

***(Signed)* Richard Donovan,**
Major General, U. S. Army,
Commanding.

Will You Help in the Vital Fire Control Program? . . .

Fires sweep over 30 million acres of woodland a year, destroying timber and property valued at more than $35,000,000. War production requires every foot of lumber. The Forest Service asks the help of citizens in protecting the nation's resources. INDIAN FIRE PUMPS, using only clear water, put fires out fast—before they spread. Drain on trained fire fighting personnel makes it essential that all Americans co-operate. INDIAN FIRE PUMPS are your best fire fighting tools. *ORDER NOW!*

Send for catalog.



Rust proof tank holds 5 gals. of wat... Pump throws 30 to 50 ft. stream ... nozzle adjusts to a spray. INDIAN ... carry slung on the back enabling oper... tor to get about quickly in fighting ... fire without stopping to pick up extin... guisher as he moves from place to place

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